Vol. 1066 Number 4

# OFFICIAL GAZETTE

## of the UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

May 27, 1986

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

# OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

May 27, 1986 Volume 1066 Number 4


## CONTENTS


| | Page |
|---|---|
| Patent and Trademark Office Notices | |
| Patent Cooperation Treaty (PCT) Information | 1066 OG 26 |
| Notice of Maintenance Fees Payable | 1066 OG 26 |
| Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees | 1066 OG 27 |
| Reissue Applications Filed | 1066 OG 27 |
| Requests for Reexaminations Filed | 1066 OG 27 |
| Errata | 1066 OG 27 |
| Patent Terms Extended Under 35 U.S.C. 156 | 1066 OG 28 |
| Registration to Practice | 1066 OG 28 |
| Service by Publication | 1066 OG 28 |
| Status of PTO Services | 1066 OG 29 |
| Patent Certificates of Correction | 1066 OG 30 |
| Disclaimers | 1066 OG 30 |
| Disclaimers and Dedications | 1066 OG 30 |
| Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries | 1066 OG 31 |
| Condition of Patent Applications | 1066 OG 32 |
| Reexaminations | 1557 |
| Reissue Patents Granted (32,157) | 1559 |
| Patents Granted | |
| General and Mechanical (4,590,621) | 1563 |
| Chemical (4,591,359) | 1823 |
| Electrical (4,591,654) | 1909 |
| Design Patents Granted (283,940) | 2063 |
| Index of Patentees | PI 1 |
| Indices of Reissue, Reexamination and Design Patentees | PI 53 |
| Classification of | |
| Patents (Including Reissues and Reexaminations) | PI 57 |
| Designs | PI 60 |
| Geographical Index of Residence of Inventors | |
| Patents (Including Reissues) | PI 61 |
| Designs | PI 62 |
| Change of Address Form and Subscription Order Form | Back Page |



The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $6.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

# PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1052 O.G. 52 on Mar. 26, 1985.

For use of the European Patent Office as Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office has been changed as of Feb. 9, 1986 and is announced in the *Official Gazette* at 1061 O.G. 30 on Dec. 31, 1985.

International PCT fees have been changed effective Jan. 1, 1986 and were announced in the *Official Gazette* at 1061 O.G. 30 on Dec. 31, 1985.

Note that the amount of the international search fee for the European Patent Office and the amounts of the International PCT fees will change effective June 1, 1986. For information on these fee changes see the notice appearing in the *Official Gazette* at 1065 O.G. 41 on Apr. 29, 1986.

The current schedule of PCT fees is as follows:

| | |
|---|---|
| Transmittal fee: . . . . . | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office as Searching Authority | |
| —No corresponding prior U.S. national application filed . . . . . | 420.00 |
| —Corresponding prior U.S. national application filed . . . . . | 250.00 |
| European Patent Office as Searching Authority | |
| if paid before June 1, 1986 . . . . . | 830.00 |
| if paid on or after June 1, 1986 . . . . . | 930.00 |
| International fees | |
| Basic fee (first 30 pages): | |
| if paid before June 1, 1986 . . . . . | 325.00 |
| if paid on or after June 1, 1986 . . . . . | 375.00 |
| Basic Supplemental fee (for each page over 30): | |
| if paid before June 1, 1986 . . . . . | 6.00 |
| if paid on or after June 1, 1986 . . . . . | 7.00 |
| Designation fee for the first 10 national or regional offices: | |
| if paid before June 1, 1986 . . . . . | 80.00 |
| if paid on or after June 1, 1986 . . . . . | 90.00 |
| Designation fee for 11th and subsequent designations . . . . . | No charge |

DONALD J. QUIGG,
Mar. 31, 1986. *Assistant Secretary and Commissioner of Patents and Trademarks.*

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### Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on May 24, 1983, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,384,369 through 4,385,402
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:
By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:
By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

### Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED MARCH 9, 1986 DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,318,248 | 06/216,071 | 3/09/82 |
| 4,318,266 | 06/216,687 | 3/09/82 |
| 4,318,292 | 06/259,293 | 3/09/82 |
| 4,318,575 | 06/222,243 | 3/09/82 |
| 4,318,684 | 06/229,457 | 3/09/82 |
| 4,318,840 | 06/217,450 | 3/09/82 |
| 4,318,868 | 06/246,028 | 3/09/82 |
| 4,318,911 | 06/220,350 | 3/09/82 |
| 4,318,977 | 06/237,171 | 3/09/82 |
| 4,319,023 | 06/245,195 | 3/09/82 |
| 4,319,099 | 06/227,321 | 3/09/82 |

### REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

**3,900,645,** Re. S.N. 840,596, Filed Mar. 17, 1986, 428/041, SCORED ADHESIVE LAMINATE, Burton D. Morgan, Owner of Record: *Morgan Adhesives Co., Stow, Ohio,* Attorney or Agent: Vern L. Oldham, et al., Ex. Gp.: 154

**4,438,720,** Re. S.N. 841,105, Filed Mar. 13, 1986, Cl. 116/215, TILT DETECTOR, Worth R. Conn, Owner of Record: *Detectors, Inc., Graham, Tex.,* Attorney or Agent: William T. Wofford, Ex. Gp.: 246

**4,442,938,** Re. S.N. 839,957, Filed Mar. 17, 1986, Cl. 206/329, TERMINAL POSITIONING METHOD AND CONSTRUCTION, James V. Murphy, Owner of Record: *Advanced Interconnections, Inc., Warwick, R.I.,* Attorney or Agent: Charles Hieken, Ex. Gp.: 241

**4,460,256,** Re. S.N. 839,045, Filed Mar. 12, 1986, Cl. 354/173.110, FILM FEEDING SYSTEM OF A CAMERA, Kunihiko Araki, et al., Owner of Record: *Ricoh Co., Ltd., Tokyo, Japan,* Attorney or Agent: Norman F. Oblon, et al., Ex. Gp.: 211

**4,476,591,** Re. S.N. 839,695, Filed Mar. 13, 1986, Cl. 623/006, LENS IMPLANT FOR INSERTION IN THE HUMAN EYE, Eric J. Arnott, Owner of Record: *Inventor,* Attorney or Agent: John E. Dumaresq, et al., Ex. Gp.: 336

**4,506,004,** Re. S.N. 838,968, Filed Mar. 12, 1986, Cl. 430/312, PRINTED WIRING BOARD, Donald F. Sullivan, Owner of Record: *Inventor,* Attorney or Agent: Laurence R. Brown, Ex. Gp.: 156

**4,514,461,** Re. S.N. 835,628, Filed Mar. 3, 1986, Cl. 428/240, FRAGRANCE IMPREGNATED FABRIC, Yen-Kong Woo, Owner of Record: *Inventor,* Attorney or Agent: Karl A. Limbach, et al., Ex. Gp.: 154

### REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**3,868,274,** Reexam. No. 90/000,990, Requested: Apr. 22, 1986, Cl. 148/1.5, METHOD FOR FABRICATING MOS DEVICES WITH MULTIPLICITY OF THRESHOLDS ON A SINGLE SEMICONDUCTOR SUBSTRATE, Robert Huber, et al., Owner of Record: *General Instrument Corp., Newark, N.J.,* Attorney or Agent: James & Franklin, Ex. Gp.: 110, Requester: J. W. Geriak, Los Angeles, Calif.

**4,062,981,** Reexam. No. 90/000,983, Requested: Apr. 9, 1986, Cl. 426/278, HUMIDIFYING AND SHIRRING ARTIFICIAL SAUSAGE CASING, Douglas J. Bridgeford, Owner of Record: *Teepak, Inc., Oak Brook, Ill.,* Attorney or Agent: Michael L. Dunn, Ex. Gp.: 130, Requester: Owner

**4,257,674,** Reexam. No. 90/000,979, Requested: Apr. 3, 1986, Cl. 350/96.210, ELASTOMERIC FIBER OPTIC SPLICE, Wendell L. Griffen, et al., Owner of Record: *GTE Service Corp., Danvers, Mass.,* Attorney or Agent: William H. McNeill, Ex. Gp.: 250, Requester: Owner

**4,461,872,** Reexam. No. 90/000,989, Requested: Apr. 21, 1986, Cl. 525/240, BLENDS OF PROPYLENE/ALPHA-OLEFIN COPOLYMER WITH ISOTATIC PROLYPROPYLENE, Aaron C. L. Su, Owner of Record: *E. I. Du Pont de Nemours & Co., Wilmington, Del.,* Attorney or Agent: Paul Steyermark, Ex. Gp.: 150, Requester: Owner

**4,512,885,** Reexam. No. 90/000,986, Requested: Apr. 15, 1986, Cl. 210/136, AQUARIUM FILTER ASSEMBLY, Allan H. Willinger, Owner of Record: *Willinger Bros., Inc., Oakland, N.J.,* Attorney or Agent: Abraham Friedman, Ex. Gp.: 130, Requester: Owner

**4,537,211,** Reexam. No. 90/000,984, Requested: Apr. 14, 1986, Cl. 137/1.000, APPARATUS FOR IMPROVING OIL STORAGE TANKS, Robert Almeida, Owner of Record: *Inventor, Scarsdale, N.Y.,* Attorney or Agent: Jay H. Maioli, Ex. Gp.: 340, Requester: Joseph Spivak, Chevy Chase, Md.

**4,551,177,** Reexam. No. 90/000,987, Requested: Apr. 14, 1986, Cl. 106/210, COMPRESSIBLE STARCHES AS BINDERS FOR TABLETS OR CAPSULES, Paulo Trubiano, et al., Owner of Record: *National Starch & Chemical Corp., Bridgewater, N.J.,* Attorney or Agent: Margaret B. Kelley, Ex. Gp.: 150, Requester: Owner

### Errata

The following registration number was inadvertently listed as cancelled in an Errata Notice in the Trademark Official Gazette of June 25, 1985.

| | | |
|---|---|---|
| 1,328,746 | TMOG 4 | June 25, 1985 |

Consequently, the above-identified registration is still active.

PATRICIA M. DAVIS,
*Administrator for*
*Trademark Operations.*

Apr. 23, 1986.

### Patent Terms Extended Under 35 U.S.C. 156

Certificates extending the terms with respect to the following patents were issued under the provisions of 35 U.S.C. 156 on Apr. 18, 1986.

Patent No. 3,708,579, granted Jan. 2, 1973, to McGusty, et al., owner of record: SmithKline Beckman Corp. Term extended 2 years.

Patent No. 3,789,832, granted Feb. 5, 1974, to Damadian, owner of record: Raymond V. Damadian. Term extended 382 days.

Patent No. 3,857,952, granted Dec. 31, 1974, to Wooldridge, et al., owner of record: May and Baker Ltd. Term extended 2 years.

Patent No. 3,878,217, granted Apr. 15, 1975, to Carr, et al., owner of record: Merrell Dow Pharmaceuticals, Inc. Term extended 2 years.

Patent No. 4,138,581, granted Feb. 6, 1979, to Minatoya, et al., owner of record: Sterling Drug, Inc. Term extended 2 years.

Patent No. 4,201,772, granted May 6, 1980, to Ingelman, et al., owner of record: Pharmacia Aktiebolag. Term extended 468 days.

Patent No. 4,237,068, granted Dec. 2, 1980, to Boyes, et al., owner of record: Astra Pharmaceutical Products, Inc. Term extended 342 days.

Patent No. 4,309,778, granted Jan. 12, 1982, to Buechel, et al., owner of record: Biomedical Engineering Trust. Term extended 90 days.

Certificates extending the terms with respect to the following patents were issued under the provisions of 35 U.S.C. 156 on Apr. 25, 1986.

Patent No. 3,577,424, granted May 4, 1971, to Ehrhart, et al., owner of record: Hoechst Aktiengesellschaft. Term extented 2 years.

Patent No. 4,005,063, granted Jan. 27, 1977, to Gendrich, et al., owner of record: Abbott Laboratories. Term extended 2 years.

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### Registration to Practice

The following list contains the names of persons applying for registration to practice before the United States Patent and Trademark Office. These persons have been given provisional recognition pursuant to 37 CFR 10.9(a) to prepare and prosecute patent applications before the Office. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7(a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical, or other grounds should be furnished the Director, Office of Enrollment and Discipline on or before June 27, 1986:

Breiner, Theodore A., 1600 Cool Spring Dr., Alexandria, Va. 22204

Jones, James L., 626 S. 23rd St., Arlington, Va. 22202

Parker, Lutrelle F., 2016 S. Fillmore St., Arlington, Va. 22204

Saitta, Thomas C., 19204 Circle Gate Dr., #202, Germantown, Md. 20874

CAMERON WEIFFENBACH,
*Director, Office of Enrollment and Discipline.*

Mar. 10, 1986.

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### Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives, shall enter an appearance within thirty days of this publication, the cancellation will be proceeded with as in the case of default.

Econo-Car International, Inc., Edina, Minn., Reg. No. 1,158,412, for the mark "ECONO-CAR — WHEN IT'S YOUR MONEY", Canc. No. 14,877.

The Lloyd H. Hall Co., Inc., New York, N.Y., Reg. No. 880,163, for the mark "MARKETCHEK, INC. AND DESIGN", Canc. No. 15,359.

ERMA S. BROWN,
*Administrator of the Trademark Trial and Appeal Board.*
For MARGARET M. LAURENCE,
*Assistant Commissioner for Trademarks.*

**Status of PTO Services**

The following is an update of the status of PTO services for April 1986:

| Service Item | FY 1985 Goal (Calendar Days) | FY 1986 Goal (Calendar Days) | Monthly Average (Calendar Days) |
|---|---|---|---|
| Filing Receipts: | | | |
| Patents | 22 | 22 | 36 |
| Trademarks | 30 | 30 | 45* |
| Patent/Trademark Copies: | | | |
| Special Window Coupons | 1 | 1 | .3 |
| Window Coupons | 5 | 5 | 1.3 |
| Mail Coupons | 29 | 26 | 18 |
| Letter Orders | 34 | 26 | 19 |
| Date of oldest unfilled order | | | Apr. 25, 1986 |
| Current Mail Date being processed | | | Apr. 30, 1986 |
| Certified Copies: | | | |
| Trademark Registrations | 30 | 30 | 7 |
| Applications-As-Filed | 20 | 10 | 12** |
| File-Wrapper/Contents | N/A | N/A | 6 |
| Walk-up Certification | 1 | 1 | 2** |
| Trademark Search Library: | | | |
| Filing Pending Marks | 21 | 21 | 38 |
| Filing Reg. Certificates | 3 | Issue Date | 7 Days Late |
| Assignments: | | | |
| Patents | 25 | 20 | 18 |
| Trademarks | 25 | 20 | 18 |
| Avg. Days from Issue Fee Payment to Issue Date | 90–100 | 90–100 | 92 |
| Issue Fee Receipts Mailed | 4 weeks prior to Issue Date | 4 weeks prior to Issue Date | On schedule |
| Patent Copies Available | Issue Date | Issue Date | 98% on Issue Date |
| Trademark Copies Available | Issue Date | Issue Date | 99% on Issue Date |

* Tapes received late from contractor.
** Delays due to equipment and supply problems.

*IMPROVEMENTS TO SERVICES*

- *CopiShare Cards* — TS Infosystems, Inc. (TSI), our facilities management contractor, has improved service for customers at the Cashier's Cage. Customers purchasing new CopiShare cards or adding money to their cards can now see the encoding process. The encoding machine has been placed so customers can see the dollar values of their transactions. After the encoding is complete, customers may also use any CopiShare unit to verify the amounts on their CopiShare cards. This new practice was suggested by a member of the public.

- *Air Conditioning* — Supplementary air conditioning has been installed and is operational in both the North and South Stacks of the Public Search Room.

- *Improvements in Security* — Users of the Public Search Room are reminded that under existing procedures, random inspections of briefcases, packages and other containers may be conducted at any time. This will support efforts to ensure the integrity of PTO search facilities.

*HELPFUL HINTS FROM THE PTO*

- *Reissue Oaths and/or Declarations* — A frequent problem in reissue practice is the failure of applicants to satisfactorily comply with 37 CFR 1.175 regarding the description of all errors of the original patent in the reissue oath or declaration. Applicants are required to specify errors in the original reissue oath or declaration at the time of filing the reissue application. They must also specify, in a supplemental oath or declaration, any errors brought to their attention during the prosecution, as well as the circumstances surrounding the occurrence or discovery of these errors. Every departure from the original patent represents an "error" and must be particularly and distinctly specified and supported in the original, or a supplemental, reissue oath or declaration under 37 CFR 1.175. See MPEP Sec. 1414 and 1444. Postponement of publication of the reissue patent may result if these requirements are not met at the time of allowance.

Direct any questions regarding this Helpful Hint to:
Al Lawrence Smith
Director, Group 350
(703) 557–3414

May 5, 1986.

THERESA A. BRELSFORD,
*Assistant Commissioner*
*for Administration.*

# PATENT NOTICES

**Certificates of Correction for the Week of May 27, 1986**

| | | | |
|---|---|---|---|
| 4,033,911 | 4,533,393 | 4,558,515 | 4,567,027 |
| 4,288,800 | 4,534,673 | 4,558,858 | 4,567,148 |
| 4,328,307 | 4,537,512 | 4,558,986 | 4,567,169 |
| 4,334,979 | 4,537,914 | 4,559,799 | 4,567,364 |
| 4,351,771 | 4,538,651 | 4,561,059 | 4,567,513 |
| 4,386,015 | 4,538,831 | 4,561,305 | 4,567,600 |
| 4,414,310 | 4,538,920 | 4,561,331 | 4,567,715 |
| 4,414,405 | 4,538,967 | 4,562,125 | 4,567,779 |
| 4,417,079 | 4,539,019 | 4,562,166 | 4,568,482 |
| 4,424,700 | 4,541,479 | 4,562,288 | 4,568,594 |
| 4,433,894 | 4,542,214 | 4,562,349 | 4,568,654 |
| 4,489,373 | 4,542,401 | 4,562,792 | 4,568,764 |
| 4,491,937 | 4,542,663 | 4,562,871 | 4,568,766 |
| 4,496,453 | 4,544,825 | 4,563,059 | 4,568,921 |
| 4,499,567 | 4,546,881 | 4,564,397 | 4,568,983 |
| 4,501,619 | 4,547,605 | 4,564,514 | 4,569,184 |
| 4,502,267 | 4,547,670 | 4,564,566 | 4,569,594 |
| 4,508,599 | 4,547,860 | 4,564,599 | 4,569,631 |
| 4,512,234 | 4,548,808 | 4,564,617 | 4,569,965 |
| 4,515,704 | 4,549,667 | 4,564,915 | 4,570,683 |
| 4,516,644 | 4,550,827 | 4,564,949 | 4,570,702 |
| 4,517,795 | 4,553,459 | 4,565,071 | 4,570,818 |
| 4,520,453 | 4,554,202 | 4,565,527 | 4,570,853 |
| 4,521,100 | 4,555,038 | 4,565,549 | 4,570,985 |
| 4,522,895 | 4,555,373 | 4,565,684 | 4,572,014 |
| 4,528,369 | 4,555,495 | 4,565,723 | 4,572,035 |
| 4,529,593 | 4,556,150 | 4,566,042 | 4,572,172 |
| 4,529,610 | 4,556,471 | 4,566,257 | 4,572,292 |
| 4,531,164 | 4,557,354 | 4,566,616 | 4,572,594 |
| 4,532,251 | 4,557,980 | 4,566,649 | 4,573,147 |

**Disclaimers**

4,163,357.—*Aloys Greive,* Munster, and *Aloys Horstmann,* Greven, Germany. APPARATUS FOR CABLE-TWISTING TWO YARNS. Patent dated Aug. 7, 1979. Disclaimer filed Mar. 20, 1986, by the assignee, *Palitex Project-Co. GmbH.*

Hereby enters this disclaimer to the remaining term of said patent.

4,170,967.—*Aloys Greive,* Munster, and *Aloys Horstmann,* Greven, Germany. CABLE-TWISTING TWO YARNS. Patent dated Jan. 1, 1980. Disclaimer filed Mar. 20, 1986, by the assignee, *Palitex Project-Co. GmbH.*

Hereby enters this disclaimer to the remaining term of said patent.

4,258,567.—*Thomas W. Fisher, III,* Akron, Ohio. TIRE SIDEWALL DEFORMITY TESTER AND METHOD. Patent dated Mar. 31, 1981. Disclaimer filed Feb. 10, 1986, by the assignee, *The Firestone Tire & Rubber Co.*

Hereby enters this disclaimer to claims 1–19 of said patent.

4,316,219.—*Terrence R. Smith,* Mapleshade and *Frank J. Marlowe,* Kingston, N.J. SYNCHRONIZING CIRCUIT ADAPTABLE FOR VARIOUS TV STANDARDS. Patent dated Feb. 16, 1982. Disclaimer filed Mar. 19, 1986, by the assignee, *RCA Corp.*

Hereby enters this disclaimer to claims 1–5 and 12 of said patent.

4,348,783.—*Albert S. Swanson,* Robbinsdale and *Robert A. Geyer,* Dayton, Minn. SCRUBBING MACHINE WITH SELECTIVE RECYCLE. Patent dated Sept. 14, 1984. Disclaimer filed Apr. 3, 1986, by the assignee, *Tennant Co.*

Hereby enters this disclaimer to claims 2 and 14 of said patent.

**Disclaimers and Dedications**

4,561,453.—*Ronald D. Rothchild,* South Orange, N.J. TREATMENT OF TOBACCO UNDER PRESSURE IN A CONTINUOUS PROCESS. Patent dated Dec. 31, 1985. Disclaimer and Dedication filed Mar. 24, 1986, by the *inventor.*

Hereby disclaims and dedicates to the Public claims 1, 2, 3, 4, 6, 12, 13 and 17, inclusive of said patent.

4,563,793.—*Robert M. Ryan,* Seattle, Wash. FRESH SALMON-CLEANING MACHINE. Patent dated Jan. 14, 1986. Disclaimer and Dedication filed Mar. 21, 1986, by the *inventor.*

Hereby disclaims and dedicates to the Public claim 4 of said patent.

## Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

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| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director | 4-01-85 |
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| MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director | 8-18-83 |
| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director | 4-25-84 |
| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director | 7-01-85 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during April 1986, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,435,460 to 3,441,959, inclusive

Plant Patents ..... Numbers 2,876 to 2,881 inclusive

# REEXAMINATIONS

## MAY 27, 1986

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

**B1 3,818,837 (511th)**

**VEHICLE AND TRACK SYSTEM**

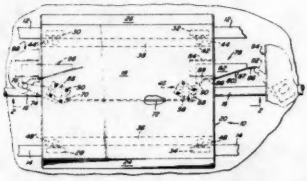
**Charles E. Jacoby, Bethlehem, and Per Eric Lindqvist, Easton, both of Pa., assignors to SI Handling Systems, Inc., Easton, Pa.**

**Reexamination Request No. 90/000,431, Aug. 8, 1983.**

**Reexamination Certificate for Patent No. 3,818,837, issued Jun. 25, 1974, Ser. No. 295,766, Oct. 6. 1972.**

**Int. Cl.[4] B61B *13/12***

**U.S. Cl. 104—166**



**AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:**

The patentability of claims **9–12** is confirmed.

Claims **1** and **3** are cancelled.

Claims **2, 4, 5, 7, 8** and **13** are determined to be patentable as amended.

Claim **6**, dependent on an amended claim, is determined to be patentable.

New claims **14–22** are added and determined to be patentable.

*17. Apparatus comprising a driverless vehicle mounted on support wheels adapted to ride on a track, at least one drive wheel means on the bottom side of said vehicle, said drive wheel means including a drive wheel oscillatable about an upright axis, a control member in at least one position thereof projecting forwardly of the vehicle relative to said drive wheel and terminating at a free end adjacent the vehicle front end, said control member being coupled to said drive wheel means for oscillating said drive wheel means about said axis, said drive wheel means including a drive wheel support, said drive wheel being mounted on said support for rotation, said control member being rigidly connected to said drive wheel support for oscillation therewith between an accumulation position and a drive position, and a speed control device supported by the vehicle and projecting generally rearwardly of the vehicle beyond the rear end thereof, the projection of said speed control device terminating in a free end and being at the same general elevation as said control member so that it may oscillate a control member on another vehicle to control the speed of the other vehicle with gradual deceleration.*

**B1 4,336,075 (512th)**

**ALUMINUM ALLOY PRODUCTS AND METHOD OF MAKING SAME**

**William E. Quist, Redmond; Michael V. Hyatt, and Sven E. Axter, both of Bellevue, all of Wash., assignors to The Boeing Company, Seattle, Wash.**

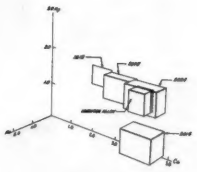
**Reexamination Request No. 90/000,516, Mar. 5, 1984.**

**Reexamination Certificate for Patent No. 4,336,075, issued Jun. 22, 1982, Ser. No. 108,214, Dec. 28, 1979.**

**Filed Mar. 5, 1984, Ser. No. 108,214**

**Int. Cl.[4] C22F *1/04***

**U.S. Cl. 148—2**



**AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:**

The patentability of claims **1–22** is confirmed.

**7.** A method of producing a product from a 2000 series aluminum alloy comprising the steps of:

forming an alloy consisting essentially of

| weight percent | element |
|---|---|
| 4.2 to 4.7 | Cu |
| 1.3 to 1.8 | Mg |
| 0.8 to 1.3 | Mn |
| 0.08 to 0.15 | Zr |
| a maximum of 0.25 | Zn |
| a maximum of 0.15 | Ti |
| a maximum of 0.10 | Cr |
| a maximum of 0.15 | Fe |
| a maximum of 0.12 | Si |
| a maximum of 0.05 | each other trace element |
| a maximum of 0.15 | total of said other trace elements |
| the balance being | Al, |

forming a body from said alloy

homogenizing said body to provide a substantially uniform distribution of alloying elements, and

hot working said body to form a wrought product, said hot working being conducted at temperatures effective to yield a product having a highly elongated grain and substantially unrecrystallized microstructure after solution treating and quenching said body.

# REISSUES

## MAY 27, 1986

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

**Re. 32,157**

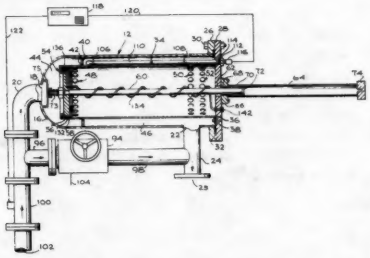
**FLOW METER PROVER APPARATUS AND METHOD**

**Charles C. Waugh, Tarzana, and Robert L. Wehrli, Malibu, both of Calif., assignors to Waugh Controls Corporation, Chatsworth, Calif.**

**Original No. 4,372,147, dated Feb. 8, 1983, Ser. No. 244,790, Mar. 17, 1981. Application for reissue Aug. 7, 1984, Ser. No. 638,397**

**Int. Cl.[4] G01F *25/00***

**U.S. Cl. 73—3** **31 Claims**



*17. Apparatus for measuring a quantity of flowing fluid by means of a piston moving in a conduit to displace a volume of fluid, comprising:*

*two seals each encircling the perimeter of the piston and forming the walls of a cavity between the seals, and means for communicating fluid pressure within the cavity to a location external to the conduit.*

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**Re. 32,158**

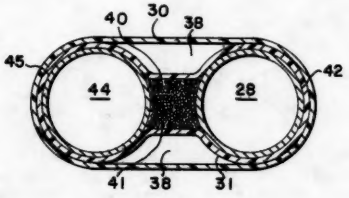
**ARTHROSCOPE**

**Marko Vukovic, 152 W. Burton Pl., Chicago, Ill. 60610**

**Original No. 4,369,768, dated Jan. 25, 1983, Ser. No. 173,952, Jul. 30, 1980. Application for reissue Feb. 7, 1984, Ser. No. 577,673**

**Int. Cl.[4] A61B *1/06***

**U.S. Cl. 128—6** **2 Claims**



**1. An arthroscope for use in diagnostic and surgical procedures involving an injured area, such as the knee and surrounding tissue, comprising:**

**a body portion;**

**a probe portion;**

**a viewing portion secured to generally opposite sides of said body portion, said arthroscope configured to provide a line-of-sight from said viewing portion to said probe portion provided through said body portion, said probe portion including a tubular instrument conduit for carrying a selected surgical instrument for operative procedures in the injured area, and a tubular viewing conduit of substantially the same diameter through which the injured area proximate to the probe tip may be viewed; said instrument conduit and said viewing conduit secured parallel to one another, said conduits secured to each other along their length and separated by a hollow joining member to form a substantially dumbbell-shaped cross-section;**

**a removable sheath configured to surround said probe along its length, said sheath [being made of a compliant material and configured slightly undersized with respect to the transverse dimensions of said probe, so that said sheath] when affixed over said probe [conforms to] *envelopes* the exterior of said instrument and viewing conduits in a fluid-tight manner, but leaving a pair of clear channels between said sheath and said joining member;**

**means for sealably connecting the instrument-insertion end of said instrument conduit to a source of irrigating liquid, so that with said sheath removed and no instrument in said instrument conduit, said instrument conduit may serve as an alternate irrigation channel for purely diagnostic observation;**

**clear passage valve means disposed in communication with said instrument conduit with the passage axis of said valve means aligned with the center axis of said instrument conduit, so that with said valve in the open position an inserted instrument can pass the length of said instrument conduit unobstructed by said valve means, and so that with said instrument removed, actuation of said valve means alternatively to an open or closed condition controls the flow of irrigation liquid when said instrument channel is serving as said alternate irrigation channel;**

**second valve means for connecting said sheath to a source of irrigation fluid to control the supply of said irrigating fluid to the area under inspection through said pair of clear channels; and,**

**illumination means in said probe for illuminating the area to be inspected, said illumination means including a plurality of fiber optic strands disposed within said hollow joining member so as to convey light from a source thereof to the tip of said probe.**

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**Re. 32,159**

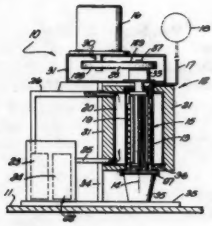
**BEATER**

**William L. Davis, 880 E. First South St., Salt Lake City, Utah 84102**

**Original No. 4,357,112, dated Nov. 2, 1982, Ser. No. 217,584, Dec. 18, 1980. Application for reissue Oct. 29, 1984, Ser. No. 666,270**

**Int. Cl.[4] B01F *7/00, 15/06***

**U.S. Cl. 366—279** **28 Claims**



*17. In apparatus for preparing a beaten product including a chamber into which the ingredients of said product are introduced*

*and a motor for powering the apparatus, a beater assembly comprising*

*a rotor body disposed in the chamber to rotate about a generally vertical axis,*

*at least one blade unit connectable to the rotor body and including a generally vertically extending member having a series of vertically spaced blades projecting outwardly therefrom toward a side wall of said chamber, said blades being twisted with respect to the vertically extending member to beat the product and advance it downwardly as the rotor body turns, with an uppermost blade being twisted more abruptly than the blades therebelow.*

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**Re. 32,160**

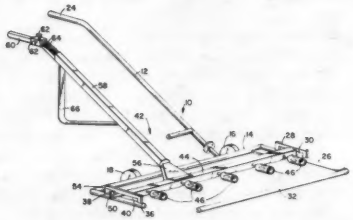
## COMBINATION ROOFING MATERIAL UNROLLING AND HEAT APPLYING APPARATUS

**William E. Kugler, 2989 S. Detroit Way, Denver, Colo. 80210, and James M. Pacello, 7330 Poppy Way, Golden, Colo. 80401**

**Original No. 4,354,893, dated Oct. 19, 1982, Ser. No. 295,734, Aug. 24, 1981. Application for reissue Oct. 19, 1984, Ser. No. 663,069**

**Int. Cl.[4] B32B** *31/26*

**U.S. Cl. 156—497** **14 Claims**



*11. A combination roofing material unrolling and heat applying apparatus, comprising:*

*frame means;*

*heating means connected to said frame means, said heating means having a first end and a second end, said heating means adapted to emit a fluid to be ignited;*

*first means for engaging a roll of the roofing material; and*

*connecting means for interconnecting said frame means and said first means so that the roll of roofing material and said frame means move simultaneously together, said connecting means including guide means which supports said first and second ends of said heating means, said heating means being movable in said guide means independently of the movement of the roll of roofing material to position said heating means relative to said first means, said heating means outputting heat for softening an adhesive layer formed on the roofing material while the roofing material is unrolled.*

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**Re. 32,161**

## PHARMACEUTICAL COMPOSITIONS CONTAINING UREA

**Steven Leigh, Croydon, England, and Peter J. Ayres, Norwich, N.Y., assignors to Phares Pharmecutical Research N.V., Curacao, Netherlands**

**Original No. 4,291,062, dated Sep. 22, 1981, Ser. No. 49,057, Jun. 15, 1979. Application for reissue Sep. 21, 1983, Ser. No. 534,140**

**Claims priority, application United Kingdom, Jun. 16, 1978, 27115/78**

**Int. Cl.[4] A61K** *31/17*

**U.S. Cl. 514—588** **9 Claims**

1. A pharmaceutical composition for application topically or by means of a suppository comprising:

(a) an effective concentration of a medicament for administration topically or by means of a suppository,

(b) from 5% to 40% of small particles of an inclusion compound of urea with at least one straight-chain aliphatic compound having from 4 to 30 carbon atoms per molecule,

(c) up to 50% of a powder that is inert to and insoluble in the remaining ingredients,

(d) from 25% to 90% of a carrier material which does not dissolve or react with any of components (a), (b), or (c), optionally together with a thickening agent to provide a composition of the desired consistency,

components (a), (b) and (c) being dispersed in component (d).

*9. A pharmaceutical composition for application topically or by means of a suppository comprising,*

*(a) an effective concentration of a medicament for administration topically or by means of a suppository,*

*(b) from 5% to 40% of small particles of an inclusion compound of urea with at least one straight-chain aliphatic compound having from 4 to 30 carbon atoms per molecule,*

*(c) up to 50% of a powder that is inert to and insoluble in the remaining ingredients,*

*(d) from 25% to 90% of a carrier material which does not react with any of components (a), (b), or (c), optionally together with a thickening agent to provide a composition of the desired consistency, components (a), (b) and (c) being dispersed in component (d).*

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**Re. 32,162**

## PRESSURE SENSITIVE RECORD MATERIAL EMPLOYING DIARYL ALKANE SOLVENTS

**Atsushi Sato, Tokyo; Yoshiaki Aida, and Isoo Shimizu, both of Yokohama, all of Japan, assignors to Nippon Petrochemicals Co., Ltd., Tokyo, Japan**

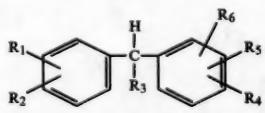
**Original No. 3,936,566, dated Feb. 3, 1976, Ser. No. 407,986, Oct. 19, 1973. Division of Ser. No. 229,195, Feb. 24, 1972, abandoned. Application for reissue Aug. 29, 1979, Ser. No. 70,711**

**Claims priority, application Japan, Mar. 2, 1971, 46-10542; Mar. 15, 1971, 46-13965**

**Int. Cl.[4] B41M** *5/16, 5/22*

**U.S. Cl. 346—213** **16 Claims**

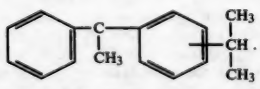
1. A pressure sensitive record material which comprises a paper sheet coated with microcapsules holding internally a liquid containing a dye-precursor and at least one compound represented by the general formula:



in which $R_1$ and $R_2$ are hydrogen; $R_3$ is methyl; $R_4$ and $R_5$ are hydrogen, methyl or ethyl; $R_6$ is an alkyl group selected from methyl, ethyl, n-propyl, isopropyl, sec-butyl and tert-butyl, and the total carbon atom number of $R_4$, $R_5$ and $R_6$ is 1–4.

*2. A pressure sensitive record material as claimed in claim 1 wherein the total carbon atom number of $R_4$, $R_5$, and $R_6$ is 3.*

*4. A pressure sensitive record material as claimed in claim 2 wherein said at least one compound is a compound of the structural formula*



## Re. 32,163
## ERROR PREVENTING DEVICE FOR AN ELECTRONIC ENGINE CONTROL APPARATUS

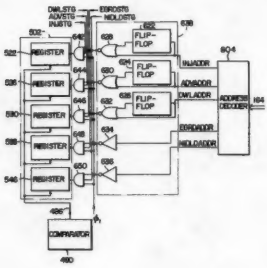
**Hiroastu Tokuda, Katsuta; Shigeki Morinaga, Hitachi, and Hideo Nakamura, Hinodemachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Original No. 4,277,829, dated Jul. 7, 1981, Ser. No. 952,276, Oct. 18, 1978. Application for reissue Jul. 7, 1983, Ser. No. 511,590**

**Claims priority, application Japan, Oct. 19, 1977, 52-125981**

**Int. Cl.[4] G05B** *15/02;* **G06F** *11/30;* **F02D** *41/26*

**U.S. Cl. 364—431.11** **72 Claims**



**43**. For use in a processor-controlled apparatus for controlling the operation of an internal combustion engine having an output crankshaft driven by mechanical energy converted from heat energy which is released by the combustion of fuel, said engine including at least fuel supply means for supplying fuel to said engine and ignition means for controlling the ignition of fuel supplied to the engine in response to signals produced by sensors in accordance with operating conditions of the engine, said sensors including rotation sensor means for generating pulses in accordance with the rotation of said output crankshaft,

a control [appartus] *apparatus* comprising in combination:

first means for generating an engine control timing signal pattern containing timing pulses occurring at predetermined intervals through which operational events of said engine are controlled;

second means for storing processor-generated engine control data;

third means, coupled to said first means, for generating respective engine timing codes the values of which are selectively modified by said engine control timing singal pattern;

fourth means, coupled to said second and third means, for comparing respective ones of said engine timing codes with respective engine control data and producing respective output signals when said respective engine timing codes define a prescribed relationship with respect to said engine control data; and

fifth means, coupled to said fourth means, for producing respective *fuel supply and ignition* control signals [to be supplied to said fuel supply means and said ignition control means in response to], *wherein the signal level of said fifth means control signals is controlled in accordance with the* respective output signals produced by said fourth means, and wherein

said second means includes means for storing first prescribed engine control data representative of a prescribed *crankshaft* angular rotation [of said crankshaft] between a predetermined angular position of [said] a crankshaft *of an engine* and the angular [positon] *position* of said crankshaft at which said rotation sensor means produces a prescribed reference pulse, and

said fourth means includes means for producing an output *fuel supply* signal [for controlling the supply of fuel to said engine by said fuel supply means] upon a first of said engine timing codes [generating] *generated* by said third means reaching a value corresponding to said first prescribed engine control data; and

wherein said control apparatus further includes

sixth means for preventing *the control of said control signal level of* said fifth means [from responding to the output signal produced by said fourth means, so that said fifth means does not supply a control signal at its output,] *by said fourth means* during the coupling of respective engine control data to said second means.

*72. A control apparatus according to claim 43, wherein said fourth means controls the signal level of said fifth means control signals by controlling whether said fifth means control signals have a binary value of "1" or "0".*

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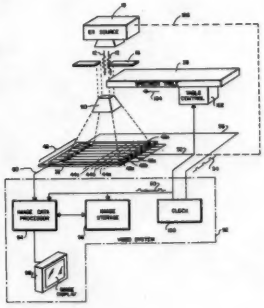
## Re. 32,164
## RADIOGRAPHIC SYSTEMS EMPLOYING MULTI-LINEAR ARRAYS OF ELECTRONIC RADIATION DETECTORS

**Robert A. Kruger, Salt Lake City, Utah, assignor to The University of Utah, Salt Lake City, Utah**

**Original No. 4,383,327, dated May 10, 1983, Ser. No. 211,792, Dec. 1, 1980. Application for reissue Apr. 22, 1985, Ser. No. 725,433**

**Int. Cl.[4] G01N** *23/00*

**U.S. Cl. 378—19** **30 Claims**



*23. A medical diagnostic imaging system for producing an image of a subject by use of penetrative radiation, said system comprising:*

*(a) a source for propagating penetrative radiation along a path;*

*(b) an array of sensors, each including means to produce a signal representing radiation when incident thereon, at least partially interposed in the path and spaced from the source to accommodate a subject therebetween;*

*(c) signal connection means for coupling said sensors in at least one series and including means for facilitating shifting of said radiation representing signals produced by said sensors of said series along said series in response to shift control signals;*

*(d) data output means for outputting signals from said series;*

*(e) image display means responsive to said outputted signals for producing a representation of an image of radiation corresponding to said outputted signals;*

*(f) motion means for generating relative motion between said array of sensors and said subject, and*

*(g) synchonization means for generating said shift control signals and causing synchronism between the occurrence of said shift control signals and said relative motion between said subject and said array.*

# PATENTS

## GRANTED MAY 27, 1986

### ERRATA

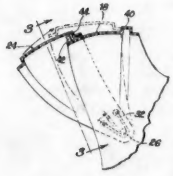
| For CLASS | See PATENT NO. |
|---|---|
| 017–049 | 4,590,830 |
| 138–115 | 4,590,958 |
| 558–429 | 4,591,460 |
| 548–146 | 4,591,628 |
| 338–308 | 4,591,821 |

# PATENTS

## GRANTED MAY 27, 1986

## GENERAL AND MECHANICAL

**4,590,621**
**CHEST PROTECTOR**
**Corrado Flosi, Via Rosselli 8, San Romano, and Roberto Maccioni, Via Vittor Pisani 37, Viareggio, both of Italy**
**Filed May 6, 1985, Ser. No. 730,459**
**Int. Cl.[4] A41D** *13/00*
**U.S. Cl. 2—2** **10 Claims**



1. An upper body protector with spring-biased epaulets comprising:
(a) a protective armor shield for covering at least a portion of the upper body;
(b) a pair of epaulets pivotally attached to said shield on the dorsal and ventral sides thereof and being moveable between a lowered position covering at least a portion of the shoulder articulation to a raised position covering less of the shoulder, to permit raising of the upper arms; and,
(c) means actively biasing each of said epaulets from said raised position into said lowered position such that they follow the upper arms down when same are lowered.

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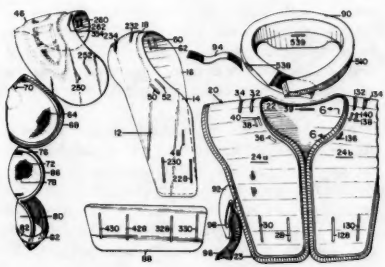
**4,590,622**
**SHOULDER, CHEST AND NECK PROTECTING DEVICE**
**Robert A. Wolfe, Amherst, and Gleisner, Donald, Lorain, both of Ohio, assignors to All American Inc., Elyria, Ohio**
**Filed Jul. 18, 1985, Ser. No. 756,443**
**Int. Cl.[4] A41D** *13/00*
**U.S. Cl. 2—2** **3 Claims**



1. A protective pad assembly comprising:
a vest type member having chest, back and shoulder portions, a plurality of apertures located on said right and left chest portions, back and shoulder portions, said vest further including an inside surface of padded material,
a semi-resilient U-shaped left hand member adapted to fit over the left side of said vest member,
a semi-resilient U-shaped right hand member adapted to fit over the right side of said vest member,
means for removeably attaching said right and left hand members to said vest member,
semi-resilient right and left epaulettes having a plurality of apertures located thereon and means removeably hingedly attaching said right and left epaulettes to said right and left vest members,
a right hand and left hand padded cap member convex in form and adapted to fit within said right and left epaulettes, said right hand and left hand cap members having an aperture located thereon and means for removeably hingedly attaching said right hand and left hand cap members to said right and left vest members,
a pair of right and left rib protector pads,
a semi-resilient chest plate member, having a plurality of apertures thereon,
means for supporting said rib protector pads and said chest plate to said right and left U-shaped members,
said apertures described herein cooperating with said attaching means described herein throughout said shoulder pad assembly.

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**4,590,623**
**ELECTROSTATIC DISSIPATIVE GARMENT**
**Fern E. Kitchman, Nashville, Tenn., assignor to Blue Bell, Inc., Greensboro, N.C.**
**Filed Sep. 17, 1984, Ser. No. 650,785**
**Int. Cl.[4] A41D** *3/02*
**U.S. Cl. 2—85** **3 Claims**

1. An electrostatic dissipative coat for wear by personnel employed in the manufacture and testing of sensitive electronic components comprising a body portion and two sleeves, said sleeves being tapered from a larger diameter at the shoulder to a smaller diameter at the wrist, wherein said wrist dimension for men's garments is substantially ten inches and for women's garments is substantially eight inches; said body portion having front and rear tails extending downwardly therefrom to a point substantially 3–5 inches above the knee, side slits between said front and rear tails at the lower portion thereof approximately three inches in length, whereby said coat is of a length sufficient to tuck beneath the seat of a person in a seated position so that contact is maintained between the coat and the normally conductive chair.

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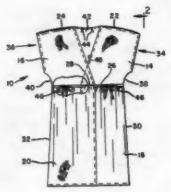
**4,590,624**
**BIRTHING GOWN**
**Georgiann Weiser, Dallas, Oreg., assignor to Weiser Design, Ltd., Amity, Oreg.**
**Filed May 13, 1985, Ser. No. 733,076**
**Int. Cl.[4] A41B** *9/00, 9/14;* **A41D** *1/22*
**U.S. Cl. 2—114** **5 Claims**

1. A birthing gown comprising; a back panel, left and right blouse panels and left and right skirt panels, said back panel forming the back of the gown, the left blouse panel and left skirt panel interconnected along lateral ajoining edges and forming the left side of the front of the gown having a free side edge and an interconnected side edge with the back panel, and the right blouse panel and right skirt panel interconnected along lateral ajoining edges and forming the right side portion

of the front of the gown having a free side edge and an interconnected side edge with the back panel, said left and right side portions having overlaping relationship, and the improvement that comprises;

each of said left and right blouse panels configured when laid flat and without stitching to be larger than the breast area of the gown, thereby producing a billowing of the blouse panels for accommodating the patient's breasts with the edges of the blouse panels interconnected to the back panel and corresponding skirt panels,



each of said left and right skirt panels configured when laid flat and without stitching to be larger than the skirt area of the gown, with the top edge sheared to produce pleating of the skirt panels and to allow billowing of the skirt panels to accommodate the patient's abdomen,

said interconnection of the left blouse panel and left skirt panel, and right blouse panel and right skirt panel cooperatively defining a waist line for location between the breasts and abdomen of the patient, and fastening means for fastening the front side portions of the gown together in overlaping relationship with the waist line located between the patient's breasts and stomach.

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**4,590,625**

**GOLFER'S GLOVE**

**George F. Keim, 9671 E. Rand Pl., Tucson, Ariz. 85715**

**Filed Mar. 18, 1985, Ser. No. 713,188**

**Int. Cl.[4] A41D** *19/00*

**U.S. Cl. 2—161 A** **15 Claims**

1. An improvement for attachment to a golfer's glove to enhance feel of the golf club in the hands of the golfer and thereby improve the golfer's swing, the improvement comprising:

a flexible first finger pad adapted to be situated between the first and second joints on the index finger;

a flexible second finger pad adapted to be situated between the first and second joints of the middle finger; and

a flexible third finger pad adapted to be situated between the first and second joints of the ring finger, said finger pads operably attached to a golfer's accuracy hand glove in position where said finger pads are situated proximate the golfer's palm and between the first and second joints on the index, middle, and ring fingers respectively when the golfer wears the glove, each said finer pads having a differently determined thickness whereby the golfer, in grasping the golf club with his hand having the finger pads, has the feel of the golf club in his hand enhanced by increasing the pressure between the first three fingers and the golf club shaft, and thus better able to control the swing of the golf club for improved hitting.

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**4,590,626**

**HUNTING GLOVE WITH PRE-ORIENTED FOREFINGER SHEATH**

**Yi-Yi Chen, P.O. Box 10160, Taipei, Taiwan**

**Filed Feb. 19, 1985, Ser. No. 702,935**

**Int. Cl.[4] A41D** *19/00, 19/02*

**U.S. Cl. 2—163** **1 Claim**

1. A hunting glove comprising a pre-oriented forefinger sheath which includes: a back-side cover pre-oriented towards the thumb, and formed with a redial-side edge pre-curved towards the thumb and formed with an ulnar-side edge also pre-curved towards the thumb, both edges being convergent to the termination of forefinger tip, and said radial-side edge of said back-side cover being sewn with the radial-side edge of said thenar-side cover and said ulnar-side edge of said back-side cover being sewn with the back-side edge of a fourchette;

said fourchette having a forefinger portion inwards pre-curved towards the palm, and formed with a forefinger portion and a middle-finger portion, said forefinger portion formed with a thenar-side edge pre-curved towards the palm and formed with a back-side edge also pre-curved, both edges convergent to the termination of forefinger tip, said thenar-side edge of said fourchette being sewn with the ulnar-side edge of said thenar-side cover and said back-side edge of said fourchette being sewn with the ulnar-side edge of said back-side cover of the forefinger sheath; and

a thenar-side cover having a length slightly shorter than the forefinger length, and formed with a radial-side edge and an ulnar-side edge, both edges convergent to the termination of forefinger tip, whereby said back-side cover, said fourchette and said thenar-side cover are combined to form a forefinger sheath which is oriented to be adapted for triggering a gun as compatible with the wearer's forefinger.

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**4,590,627**

**CURVED GLOVE CONSTRUCTION UTILIZING ELASTICIZED THREADED SEAMS**

**John R. Connelly, Deerfield, Ill., assignor to Marmon Company, Chicago, Ill.**

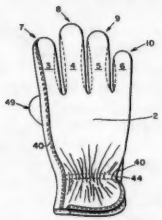
**Filed Apr. 1, 1985, Ser. No. 718,967**

**Int. Cl.[4] A41D** *19/00*

**U.S. Cl. 2—163** **9 Claims**

1. A curved glove construction having at least one curved

finger portion with back and palm sides, the improvement comprising in that said curved finger portion has at least one



elasticized thread stitching extending along a part of the length of said finger portion and on only the palm side thereof.

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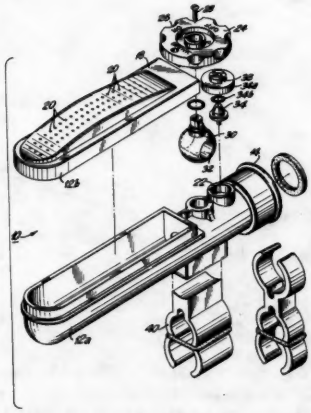
4,590,628

## FOUNTAIN DEVICE

Anthony DeGregorio, Brooklyn, N.Y., assignor to Preferred Services, Ltd., New York, N.Y.

Filed Aug. 9, 1984, Ser. No. 639,348
Int. Cl.[4] E03C *1/00*
U.S. Cl. 4—191 8 Claims



1. A fountain device usable with a hose for selectively producing either a spray or a stream of water, the device comprising:

an elongated hollow body portion having a water inlet formed at one end thereof;

a water exit surface on said body portion, said surface formed with a plurality of small water exit ports and a large water exit port therein; and,

flow selecting means for controlling the flow of water through said body portion;

said flow selecting means comprising first valve means positioned in the path of flow or water from said inlet to said small water exit ports and movable between a closed and an open state, second valve means normally closing said large water exit port and movable to an open position to permit flow of water through said large water exit port, and single control means connected to said first and second valve means and operable from a first position in which said first and second valve means are closed, to a second position in which said first valve means is open and said second valve means is closed, and to a third position in which said first valve means is closed and said second valve means is open.

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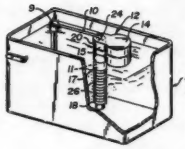
4,590,629

## TOILET VENTILATING DEVICE

Leonard A. Lusk, 19409 - 80th Ave., Surrey, B.C., Canada (V3S 4P1)

Filed Jul. 27, 1984, Ser. No. 635,275
Int. Cl.[4] E03D *9/04*
U.S. Cl. 4—213 3 Claims



1. A toilet ventilating device for use with a toilet having a bowl and a water tank, comprising:

(a) an air pump having an input and an outlet;

(b) an odor inlet fitting adapted to communicate with the toilet bowl and the inlet of said air pump, so that air can be drawn from the toilet bowl through said odor inlet fitting, said odor inlet fitting comprising an adaptor dimensioned to fit over the upper end of an overflow pipe in the water tank, so that air can normally be withdrawn through the overflow pipe, and water can overflow into it, said adaptor comprising an exhaust pipe having an opening in one end such that the pipe can be positioned over the overflow pipe and extend downwardly thereabout; and

(c) an odor outlet fitting adapted to communicate between water in the water tank of the toilet, and the air pump outlet, so that air from the air pump outlet can pass into water in the water tank of the toilet, said odor outlet fitting comprising a gas diffuser adapted to be placed in the water tank and in communication with the air pump outlet.

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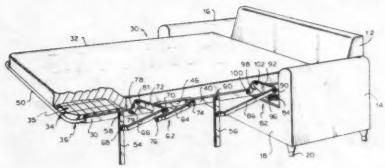
4,590,630

## TRI-FOLD MECHANISM

John Barabas, New Hyde Park, N.Y., assignor to Castro Convertibles Corporation, New York, N.Y.

Filed Feb. 5, 1985, Ser. No. 699,206
Int. Cl.[4] A47C *17/04*
U.S. Cl. 5—13 7 Claims



1. In a convertible sofa-bed having a mechanism support frame, a folding mechanism for supporting a mattress when unfolded and for supporting a seat when folded with the mechanism located within the frame below the seat; said mechanism having first, second and third main sections, a shorter fourth section pivotally interconnecting said first and second sections, and a shorter fifth section pivotally interconnecting said second and third sections, support linkage means for movably supporting said third section within said frame for movement between a first position in the unfolded position of the mechanism and a second position lower in said frame than said first position in the folded position of the mechanism with said first and second sections folded above the third section within the frame; leg means respectively pivotally connected to said first

and second sections and a linkage mechanism for folding and unfolding said frame sections including a pair of sub-linkages each of which includes first and second control links extending generally parallel to, but offset from each other, in the unfolded position of the mechanism and crossing each other in the folded position, and a control plate associated with each of said sub-linkages; the first control link in one of said pairs being pivotally connected at one end to the leg means of said first section and at its other end to its associated control plate in proximity to said fourth section, the second control link of that pair being pivotally connected at one end to its associated control plate such that in the unfolded position of the mechanism said one end thereof is below the first link and closer to said leg means of the first section than said other end of the first link; the first control link in the other of said pairs of sub-linkages being pivotally connected at one end to the leg means of said second section and at its other end to its associated control plate in proximity to said fifth section, the second control link of that pair being pivotally connected at one end to its associated control plate such that in the unfolded position of the mechanism said one end thereof is below the first link and closer to said leg means of the section section than said other end of first link; said sub-linkages each also including an over-the-center link respectively pivotally connected at one end to the first and second sections between their associated leg means and the pivotal connections of said fourth and fifth sections to the first and second sections; the opposite ends of said over-the-center links being respectively connected to the control plates of their respective sub-linkages such that in the unfolded position of the mechanism the points of connection of the over-the-center links and their associated control plates are located between and above the points of connection of the over-the-center links and their respective sections and shorter sections, whereby initial pivotal movement of said first section about its connection with said fourth section initially causes said fourth section to pivot about the second section and continued pivotal movement causes the leg means of the first section to pivot to a folded position parallel to the first section when the first section is parallel to and over the second section and thereafter, continued pivotal movement of said third section abouts its connection with said fifth section initially causes said fifth section to pivot about the third section and continued pivotal movement causes the leg means of the second section to pivot to a folded position parallel to the second section when the second section is parallel to the third section and with said first section between and parallel to both, thereby to form a compact arrangement within the sofa frame beneath the seat thereof.

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**4,590,631**

## INFANT ROCKING DEVICE

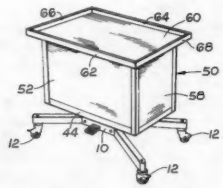
**Gordon Varney, 20 Cherry Field Rd., Broken Cross, Macclesfield Cheshire, England**

**Filed Jun. 11, 1984, Ser. No. 619,265**

**Claims priority, application United Kingdom, Jun. 18, 1983, 8316624; Oct. 29, 1983, 8328944**

**Int. Cl.[4] A47D *9/00*; A61H *1/00***

**U.S. Cl. 5—101** **9 Claims**




1. An infant rocking device comprising
a base;
support means upstanding from said base;
upper support beams fixed transversely upon said support means;
pivotal arms hanging downwards from said upper support beams;
lower support beams arranged transversely and pivotally suspended from said arms;
enclosure means carried by said lower beam and enclosing said upper beams, said support means and said arms;
a receptacle suitable for accommodating an infant supported upon said enclosure means; and
drive means comprising a first solenoid arrangement incorporating a first armature connected to said first armature whereby said second armature moves attached between respective arms, and a second solenoid arrangement having a second armature in register with said first armature for controlling the direction of current supplied to said first solenoid arrangement thereby moving said first armature alternately in one direction and then the other direction so as to swing said arms and thereby effect reciprocation of said enclosure means.

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**4,590,632**

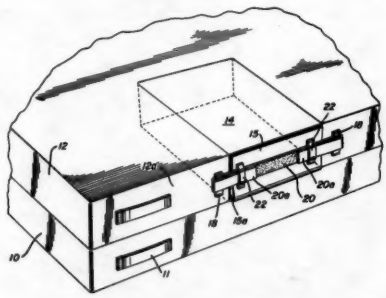
## MATTRESS FOR ACCOMMODATING BEDPAN OR THERAPEUTIC DEVICE

**Benjamin S. Meyer, 229 Richmar Dr., Birmingham, Ala. 35213**

**Filed Sep. 24, 1984, Ser. No. 653,745**

**Int. Cl.[4] A47C *27/00*; A61G *7/02***

**U.S. Cl. 5—462** **3 Claims**




1. A mattress system comprising two superimposed elongated generally rectangular in cross section mattress bodies having longitudinal and transverse axes, the lower said body serving as a support for the upper body, said upper body defining a cutout extending from one of its long edges, a drawer having complementary dimensions received in said cutout and slidable on said lower mattress body so said upper body and drawer fully received in said cutout together constitute a continuous upper supporting surface, expansion means on the front of said drawer and detachable tension means pressing against said drawer and expansion means to force said drawer into said outout to maintain the continuous upper supporting surface while allowing said drawer to be pulled out partially or fully by sliding on said lower mattress body, said expansion means being comprised of a pocket pleated at the bottom to allow expansion of the pocket.

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**4,590,633**

## DOLL/BLANKET

**Arbria E. Pickens, 301 Canyon Ridge Dr., Richardson, Tex. 75080**

**Filed Jan. 3, 1984, Ser. No. 567,906**

**Int. Cl.[4] A47C *31/00***

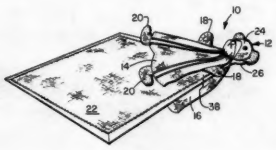
**U.S. Cl. 5—482** **11 Claims**

1. A doll including a receptacle for receiving and storing bedding comprising:

a hollow conical body, fashioned from a plurality of panels of flexible material, for storing one or more sheets of flexible material therein;

a head affixed to and closing the tapered end of said conical body; and

one or more sheets of flexible material connected to the



inner surface of said conical body, wherein said sheets of flexible material are rectangular and wherein a corner of each of said sheets is connected to a portion of the inner surface of said conical body, said sheets of flexible material having a surface area several times larger than the surface area of the panels of flexible material for folding and storing in the conical body.

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**4,590,634**

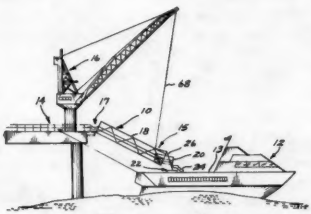
**MARINE TRANSFER DEVICE**

**John W. Williams, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Dec. 20, 1984, Ser. No. 684,267**

**Int. Cl.[4] E01D** *1/00*

**U.S. Cl. 14—71.1** **7 Claims**



1. A marine transfer device for transferring personnel or material between a stationary object, such as an offshore platform, and a moving object, such as a ship's deck, the device comprising:

(a) a ramp positionable to extend between the platform and near the ship's deck, the ramp including:

(i) an inboard end pivotally attached to the platform;

(ii) an outboard end positionable near the ship's deck;

(iii) a walkway between the inboard end and the outboard end;

(b) ramp support means attached to the outboard end of the ramp for supporting the outboard end of the ramp when the outboard end of the ramp is positioned near the ship's deck, the ramp support means including:

(i) a landing pad, the landing pad resting on the deck when the outboard end of the ramp is positioned near the ship's deck; and

(ii) a movable frame interconnected between the landing pad and the ramp;

(c) a carriage assembly having an inboard end, an outboard end and a floor, the inboard end of the carriage assembly being in movable contact with the walkway of the ramp, the outboard end of the carriage assembly being hingedly attached to the frame; and

(d) stairs extending from the outboard end of the carriage assembly to the deck of the ship for allowing personnel to step from the deck to the floor of the carriage assembly.

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**4,590,635**

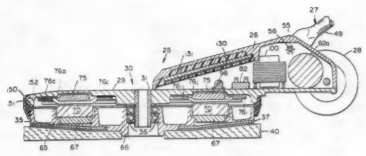
**MACHINE FOR FLOOR MAINTENANCE**

**Hartwell F. Tucker, Los Altos; Jeffrey R. Tucker, Mountain View; Dennis Ross, San Leandro, and Jeffrey G. Knirck, San Jose, all of Calif., assignors to Octa, Inc., Mountain View, Calif.**

**Continuation-in-part of Ser. No. 409,845, Aug. 20, 1982, Pat. No. 4,443,906. This application Apr. 23, 1984, Ser. No. 603,205**

**Int. Cl.[4] A47L** *11/03, 11/14*

**U.S. Cl. 15—50 R** **10 Claims**



1. A floor machine comprising:

(a) a body;

(b) an annular stator supported by said body;

(c) a shaft disposed in and fixed to said stator with the axis thereof coincident with the axis of said stator; and

(d) an annular rotor journalled for rotation about said shaft relative to said stator and having an axis coincident with the axis of said shaft;

(e) said rotor comprising means for activating floor maintenance means,

(f) said means for activating floor maintenance means comprises a surface formed with a convex configuration for engaging floor maintenance means.

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**4,590,636**

**VIBRATION DEVICE FOR THE REMOVAL OF BURRS FROM WORKPIECES CONSTRUCTED AS FOUNDRY CORES OR THE LIKE**

**Gerhard Wehrmann, Mettmann, Fed. Rep. of Germany, assignor to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland**

**Filed Jun. 20, 1984, Ser. No. 622,663**

**Claims priority, application Fed. Rep. of Germany, Jun. 20, 1983, 3322567**

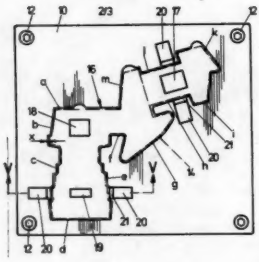
**Int. Cl.[4] A47L** *7/02;* **B08B** *3/12*

**U.S. Cl. 15—94** **13 Claims**

1. A vibration device for removing burrs from a peripheral edge of a workpiece, comprising

gripping means for holding said workpiece, said gripping means having impact surfaces which substantially conform to said peripheral edge of said workpiece at least in the region of said burrs, said impact surfaces being spaced apart from said peripheral edge so as to define a clearance therebetween, and

oscillation means for vibrating said impact surfaces against said burrs,



whereby said impact surfaces make vibrating contact with said burrs to mechanically remove said burrs from said workpiece.

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**4,590,637**

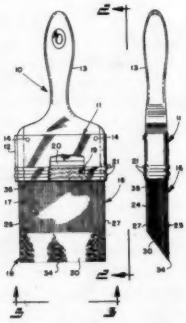
**GENERAL PURPOSE PAINT BRUSH**

**Frank Marino, Baldwin, N.Y., assignor to The Wooster Brush Company, Wooster, Ohio**

**Filed Aug. 2, 1984, Ser. No. 636,978**

**Int. Cl.[4] A46B *9/02***

**U.S. Cl. 15—160** **9 Claims**



1. A general purpose paint brush comprising an elongate handle, a generally tubular, longitudinally extending ferrule secured to said handle, and a tuft of paint brush bristles having a working end and a root end, said root end being anchored in said ferrule with the bristles extending longitudinally in relation to said ferrule to said working end, said tuft having substantially parallel wide planar side faces extending transversely the width of said tuft and defining therebetween a lesser thickness of said tuft, said handle being longitudinally aligned with said ferrule throughout the entire length of said handle, and said working end of said tuft having substantially planar working surface means extending the full width of said tuft and sharply angled in relation to a plane normal to lengths of the bristles from one side face to the other side face of said tuft across the full thickness of said tuft to provide for greater exposure of bristles at the working surface means to permit the brush to hold and apply more paint, said working surface means forming with the longer of said side faces a sharp knife edge, said ferrule having a tuft end terminating at a plane normal to the longitudinal extents of the bristles and parallel to said knife edge across the entire width of said tuft along both of said side faces.

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**4,590,638**

**WIPER BLADE WITH AIR DEFLECTING DEVICE**

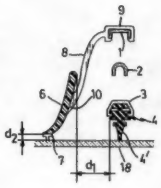
**Christian Bénéteau, Gorcy, France, assignor to Champion Spark Plug Europe S.A., Virton, Belgium**

**Filed Sep. 7, 1984, Ser. No. 648,302**

**Claims priority, application France, Sep. 28, 1983, 83 15421**

**Int. Cl.[4] B60S *1/04, 1/38***

**U.S. Cl. 15—250.42** **14 Claims**



13. A wiper blade comprising a wiping element, at least one air deflecting device and a superstructure characterized in that the air deflecting device has an elongate edge, first and second spaced abutments are provided on the elongate edge and means secure the air deflecting device to the superstructure so that the abutments can bear on a surface to be wiped and transmit substantially the entire force from the deflecting device to the surface, said abutment effectively guiding the deflecting device over the surface without binding with the surface.

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**4,590,639**

**DOOR CLOSER**

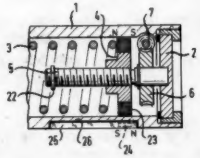
**Karl Fritsche, and Wilhelm Vahs, both of Stuttgart, Fed. Rep. of Germany, assignors to Geze GmbH, Leonberg, Fed. Rep. of Germany**

**Filed May 16, 1983, Ser. No. 494,928**

**Claims priority, application Fed. Rep. of Germany, Jun. 29, 1982, 3224300**

**Int. Cl.[4] E05F *1/08***

**U.S. Cl. 16—79** **1 Claim**



1. A door closer comprising a substantially horizontally extending non-magnetic housing with an outer wall having a recess; compression coil spring means disposed within said housing and having first and second ends; a spring plate disposed at said second end of said spring means and having a permanent magnet arranged thereon; means carrying said spring plate for adjustment movement within said housing to thereby adjust the position of said spring plate and said second end within said housing and relative to said first end to adjustably vary said spring bias; actuation means cooperating with said carrying means and accessible from outside of said hous-

ing for adjusting the position of said spring plate; a movable indicator device the position of which is readable from outside of said housing and consisting at least in part of a steel ball arranged in a transparent tubule secured in said recess and magnetically coupled to said permanent magnet, the tubule having a diameter which is largest at the center thereof and continuously reduces towards its two ends, whereby adjustment movement of said spring plate results in corresponding movement of said indicator device, thereby providing a reading of the selected level of said spring bias, the capture region of the permanent magnet being at least the same as one half of the length of the tubule.

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**4,590,640**

## HANDLE FOR PLASTIC BAG

**Richard W. Enersen, 617 E. Thomas St., Seattle, Wash. 98102**

**Filed Feb. 13, 1985, Ser. No. 701,294**

**Int. Cl.[4] B65D *33/06***

**U.S. Cl. 16—114 B** **2 Claims**

1. A handle for lifting a bag that includes one or more loops adapted for allowing the bag to be carried in a person's hand, the handle comprising an elongate member having a pair of spaced-apart side members that define a recess that extends along one side of the elongated member, the elongated member being shaped such that the elongated member can be held in the hand with the recess opening away from the hand, wherein one side member includes an opening extending laterally through said one side member for receiving a key ring or the like, and wherein the other side member comprises a cut-away portion opposite the opening.

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**4,590,641**

## ADJUSTABLE CROSSLINK HINGE

**Karl Lautenschläger; Horst Lautenschläger, both of Reinheim, and Gerhard W. Lautenschläger, Brensbach, all of Fed. Rep. of Germany, assignors to Mepla, Inc., High Point, N.C.**

**Filed Mar. 17, 1983, Ser. No. 476,391**

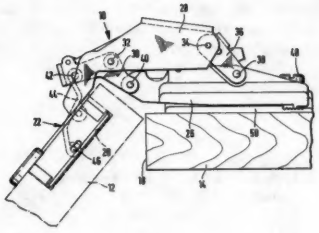
**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1982, 3209900**

**The portion of the term of this patent subsequent to Sep. 11, 2001, has been disclaimed.**

**Int. Cl.[4] E05D *7/04***

**U.S. Cl. 16—238** **12 Claims**

1. A crosslink hinge for pivotally mounting a door leaf having a back face, to a carcass of a cabinet about a hinge pivot axis, said hinge comprising: a carcass-related hinge part; a door leaf related hinge part; first and second link arms each having one end, another end, and a middle region therebetween; said arms being joined pivotingly to each other in said middle regions thereof in a scissor-like manner, said first link arm being joined at said one end thereof to said carcass-related hinge part, said second link arm being joined at said one end thereof to said door leaf related hinge part; said door leaf related hinge part being a bipartite cup-like insert adapted to be set in a recess in the back face of the door leaf, said first and second link arms at said other ends being coupled to said door leaf related hinge part and carcass-related hinge part respectively; said carcass-related hinge part having a bottom, a projection in said bottom in an area near said hinge pivot axis, said projection having an approximately inverted-T-shaped cross section; and a mounting plate to be secured to the cabinet carcass and having a socket of T-shape complementary to that of said projection, said projection being received in said socket; said socket being open at a top thereof facing said carcass-related hinge part and at a front end thereof facing said door-leaf back side, and said carcass-related hinge part at an end pointing into the interior of the carcass being provided with an open-ended longitudinal slot through which a shank of a mounting screw is adapted to be threaded into said mounting plate until a head of the screw engages an upper side of the carcass-related hinge part; said bipartite insert comprising: an attaching means adapted to be matingly inserted into the door recess, and a link holder having at least a portion sunkenly engaged in a recess of said attaching means and being displaceable by a given amount relative to said attaching means at right




angles to said hinge pivot axis and parallel to the back side of the door leaf, and adapted to be fastened on the door leaf at any desired position within said given amount of displacement, said link holder having a flange lying upon the back side of the door leaf and covering said attaching means in all relative displacement positions, said flange, in the area opposite an edge of the door leaf, forming an enlarged mounting flange, at least one elongated hole in said mounting flange and disposed in the direction of displacement of said link holder relative to said attaching means for the passage therethrough of the shank of an associated mounting screw, said mounting flange having a bottom facing the back side of the door leaf, said bottom having a shallow recess, said attaching means having at least one flat, ear-like projection engaging said recess, said projection being smaller than said recess by said given amount of displacement of said link holder relative to said attaching means.

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**4,590,642**

## PIVOTAL HINGE FOR AN ARM OF AN AWNING

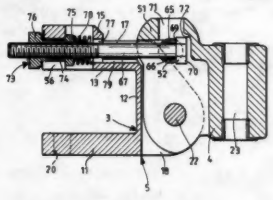
**Karl Hesener, Finnentrop-Heggen, Fed. Rep. of Germany, assignor to Paul Voss GmbH u. Co., Fed. Rep. of Germany**

**Filed Nov. 27, 1984, Ser. No. 675,216**

**Claims priority, application Fed. Rep. of Germany, Jun. 16, 1984, 3422449**

**Int. Cl.[4] E05D *7/06***

**U.S. Cl. 16—241** **5 Claims**




1. A pivotal hinge for an arm of an awning of the type wherein a supporting block is tightly clamped onto a rectangular supporting tube and carries a pivotal bracket that is swing-

able and lockable about an axle disposed in parallel with the supporting tube, said hinge comprises:

(a) the supporting block being in the configuration of a yoke including two legs joined by a central web, with one leg being defined by a pair of parallel webs;

(b) a cross web connecting the parallel webs, the cross web including a semicylindrical groove formed between a pair of front surfaces, and a guide passage;

(c) a pair of projections extending beyond the central web, with a pair of spaced eyes formed in the projections;

(d) said axle being a supporting trunnion disposed in the pair of eyes;

(e) said pivotal bracket supported on the supporting trunnion;

(f) a threaded sleeve rotatably supported in the semicylindrical groove, the sleeve including a pair of spaced flanges which abut the front surfaces of the groove;

(g) a helical spring tensioning one flange of the threaded sleeve against its corresponding front surface; and

(h) a threaded bolt engaged through the threaded sleeve and guide passage, the bolt including one end pivotally connected to the pivotal bracket.

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**4,590,643**

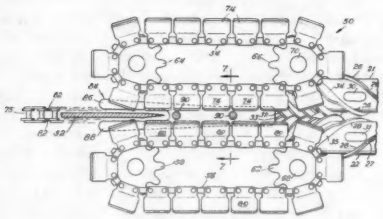
**HIGH YIELD GIZZARD HARVESTING APPARATUS**

**William J. Hill, P.O. Box 230, Ball Ground, Ga. 30107**

**Filed Jan. 26, 1983, Ser. No. 461,271**

**Int. Cl.[4] A22C *21/00***

**U.S. Cl. 17—11** **19 Claims**



1. In a poultry gizzard harvesting apparatus of the type having a pair of side-by-side linked transport chains for gripping a gizzard therebetween and transporting said gizzard in a desired direction, the improvement in said transport chains comprising means defining elongated chamber means with concave side wall means sized for engaging at least a portion of the top and bottom surfaces of the gizzard to confine it therebetween, and for engaging at least a portion of the opposing sides of said gizzard to confine it therebetween, said elongated chamber means defining an open-ended passageway to orient the gizzard lengthwise generally parallel to the elongated dimensions of said chamber means, and gizzard reorienting means for engaging a gizzard while in said chamber means, said reorienting means being movable in a direction generally parallel to that of said transport chains to rotate said gizzard to a different reorientation.

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**4,590,644**

**CLAM OPENER**

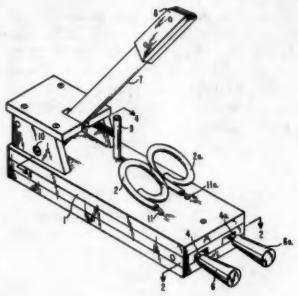
**Nunzio T. Maniscalco, 4223 Madison Ave., Trumbull, Conn. 06611**

**Filed May 29, 1985, Ser. No. 739,464**

**Int. Cl.[4] A22C *29/00***

**U.S. Cl. 17—76** **2 Claims**

1. A clam opener having a base, a pair of holders with extensions pivoting in openings in said base, said extensions being integrally connected at right angles to arms longitudinally disposed under said base, said arms being forced apart by a spring, thereby imparting an inward force to said holders for



firmly grasping a clam placed therebetween, and a knife blade pivotally connected to a knife support for opening the clam.

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**4,590,645**

**CARD CLOTHING FOR CARDING MACHINES**

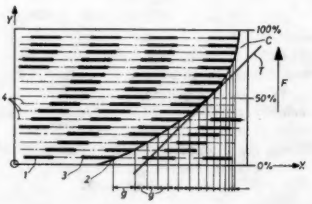
**Ralph Graf, Freienbach, Switzerland, assignor to Graf & Cie AG, Rapperswil, Switzerland**

**Filed Aug. 29, 1984, Ser. No. 645,502**

**Claims priority, application Switzerland, Sep. 29, 1983, 5285/83**

**Int. Cl.[4] D01G *15/84***

**U.S. Cl. 19—114** **9 Claims**



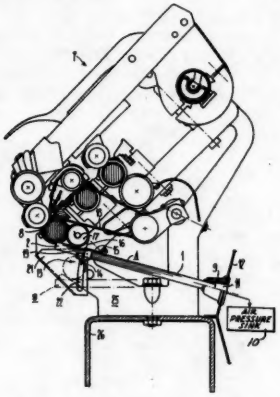
1. An improved card clothing for carding machines, including a plurality of card wire teeth arranged in rows including leading rows located at a leading end of said card clothing and trailing rows located at a trailing end of said card clothing with respect to direction of fiber flow and set into a card fillet, which wire teeth are shaped to have a base section, a first point including a first tip projecting from one end of said base section and a second point including a second tip projecting from the opposite end of said base section, in which at least the first tips of the card wires of said trailing rows are laterally displaced at least in groups in decreasing measure seen in the direction of fiber flow relative to the first tips of the card wires of said leading rows with a progressive decrease in lateral displacement from said leading end to said trailing end.

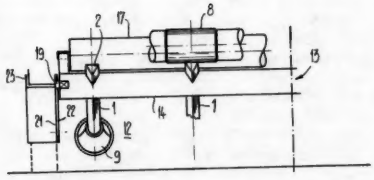
4,590,646

## ASPIRATOR SYSTEMS

Hermann Gasser, Frauenfeld, Switzerland, assignor to Galipag, Frauenfeld, Switzerland

Filed Jun. 26, 1984, Ser. No. 624,610
Claims priority, application Switzerland, Jul. 6, 1983, 3703/83
Int. Cl.[4] D01H *5/60*
U.S. Cl. 19—262 21 Claims





21. An aspirator comprising:

a suction pipe having at a front end a triangular suction opening and having in continuation of said triangular suction opening a triangular cross section being congruent with said triangular suction opening and extending along the whole length of said suction pipe.

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4,590,647

## DEVICE FOR CLEANING ROTATING ROLLERS OF TEXTILE MACHINES

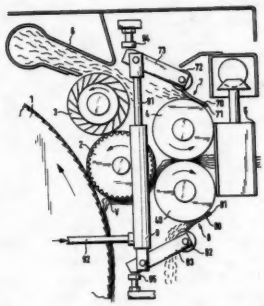
Max Fahmüller, Ingolstadt, Fed. Rep. of Germany, assignor to Schubert & Salzer, Ingolstadt, Fed. Rep. of Germany

Filed Oct. 1, 1984, Ser. No. 656,666
Claims priority, application Fed. Rep. of Germany, Oct. 5, 1983, 3336184
Int. Cl.[4] D06B *23/30, 15/02;* D01G *15/80*
U.S. Cl. 19—262 8 Claims

1. A device for cleaning rotating rollers of textile machines comprising:

(a) a stripping knife, the front edge of which is pressed against the surface of the roller in a first working position; and

(b) means for moving the stripping knife while maintaining its contact with the roller into a second working position



in which the knife body touches the roller and the front edge of the knife is spaced apart from the roller.

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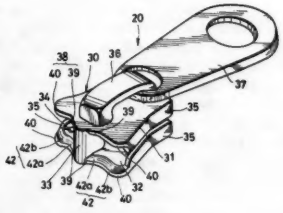
4,590,648

## SLIDER FOR SLIDE FASTENER

Hiroshi Yoshida, and Susumu Ishii, both of Kurobe, Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan

Filed Apr. 25, 1984, Ser. No. 603,747
Claims priority, application Japan, May 7, 1983, 58-68212[U]
Int. Cl.[4] A44B *19/26*
U.S. Cl. 24—415 8 Claims



1. A slider for a slide fastener including a pair of stringer tapes carrying along their inner longitudinal edges a pair of rows of coupling elements, each coupling element having a leg portion mounted on the longitudinal edge and a coupling head projecting beyond the longitudinal edge transversely of the stringer tape, said slider comprising:

(a) a slider body including a pair of parallel spaced wings joined at their front end by a neck so as to define therebetween a substantially Y-shaped guide channel for the passage of the rows of coupling elements, at least one of said wings having a pair of flanges projecting from opposite lateral edges thereof toward the other wing and defining therebetween a portion of said guide channel;

(b) each of said wings having a front overlying each other, the edges thereof being coextensive relative to each other and extending between said opposite lateral edges thereof across said neck, each said front edge having a pair of outer portions respectively disposed adjacent to said opposite lateral edges and projecting forwardly beyond a pair of planes extending respectively between a front end of said neck and respective front ends of said flanges; and

(c) each of said wings having a pair of sloped interior guide surfaces extending respectively along each said outer portions of said front edge and facing forwardly of said slider body, said guide surfaces being engageable with the leg portions of the coupling elements.

**4,590,649**

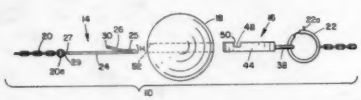
## JEWELRY CATCH

**James D. Neilson, Jr., Greensboro, N.C., assignor to Bailey & Wasson Trading Company, San Antonio, Tex.**

**Continuation-in-part of Ser. No. 389,062, Jun. 16, 1982. This application Dec. 29, 1983, Ser. No. 566,867**

**Int. Cl.[4] A44B *17/00***

**U.S. Cl. 24—616** **3 Claims**



**1.** An improved jewelry catch made of precious metals adapted to provide releasable, locking engagement between opposite ends of a jewelry chain, comprising:

a rectangular box having a forward end and a rearward end, said box having a generally square orifice on said forward end thereof, said box having a length of approximately 0.220 inches, a height of approximately 0.050 inches, and a width of approximately 0.050 inches, means on said rearward end thereof for attaching said box to a first end of said chain, and an opening in said box intermediate said forward and rear ends of said box, said opening extending the full width of said box; and

a pin formed from a sheet of said precious metal having a forward end and a rearward end and having a width substantially equal to an inside width of said orifice, said pin adapted to be received within said box through said orifice, said forward end of said pin folded back against itself so said forward end points toward said rearward end, the folded portion is further bent at an intermediate point so that said bent portion diverges from said folded portion to form a resiliently depressable tab, said tab having a width substantially equal to the inside width of said orifice, said tab extending through said opening in said box when said pin is received therein, said tab having an edge facing said pin's rearward end for abutting against an edge of said opening facing said box's rearward end when said tab extends through said opening, a bottom portion of said front end of said pin contacting substantially the entire width of a bottom surface of said box while a portion of said tab edge contacts substantially the entire width of said opening edge when said pin is fully received within said box, said rearward end of said pin having a means thereon for attaching said pin to a second end of said chain opposite said first end, said pin having a length of approximately 0.360 inches, a width of approximately 0.036 inches, and a height of approximately 0.050 inches from a base of said bottom portion to a top of said tab, said pin further being sufficiently restricted in size to permit insertion thereof through a passage within a piece of jewelry, said passage having a diameter approximately 0.08 inches or less.

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**4,590,650**

## ELECTRICAL HARNESS FABRICATION MACHINE

**Richard L. Brown, Aurora; Daniel J. Anderson, Elmhurst, and Leonard J. Lickus, Plainfield, all of Ill., assignors to Molex Incorporated, Lisle, Ill.**

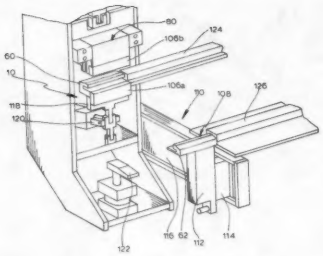
**Filed Feb. 27, 1984, Ser. No. 584,041**

**Int. Cl.[4] B23P *19/00*; H01R *43/04***

**U.S. Cl. 29—33 M** **37 Claims**

**1.** In a machine for fabricating an electrical harness including a connector electrically connected to a plurality of conductors, said connector having a housing with a plurality of terminal receiving cavities therein and a plurality of terminals mounted in said cavities, each terminal having a conductor engaging portion and being moveable between a partially preloaded position relative to the housing wherein the conductor engaging portions extend out of the housing to an inserted position wherein said terminals are fully seated within their respective cavities,

said machine including a connector nest for holding and positioning a partially preloaded connector having a floor defining a support surface for said connector, a termination station whereat a partially preloaded connector is electrically connected to a plurality of wire conductors, a wire conductor source for storing conductors and guiding them to the termination station, wire clamping means for releaseably holding the conductors at the termination station, a termination assembly including a termination head for simultaneously attaching the conductors to the terminal conductor engaging portions, said connector nest and termination assembly being mounted for up and down



relative movement between a first position wherein said nest is spaced from said termination assembly and a second position wherein said conductors and conductor engaging portions are terminated, means for feeding a predetermined length of conductors, cutting means for cutting the conductors at the predetermined length after being terminated, and terminal insertion means for inserting the terminals to their inserted position,

the improvement comprising:

said termination assembly including pilot means adjacent said head and cooperating with said conductors and nest for accurately positioning the termination head, conductors and conductor engaging portions with respect to one another when the nest and termination assembly are in their second position.

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**4,590,651**

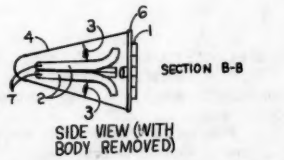
## SHARPENER FOR PHILLIPSHEAD SCREWDRIVERS

**Joseph D. Roberts, U.S. Post Office, Aiea Shopping Center, Room 121, Aiea, Hi. 96701**

**Filed Jul. 22, 1985, Ser. No. 757,479**

**Int. Cl.[4] B23D *71/08***

**U.S. Cl. 29—80** **4 Claims**




**1.** A sharpener for phillipshead screwdrivers comprising: an elongated hollow body having a central longitudinal axis, four triangular cross section files extending parallel to the longitudinal axis of said body, means pivotally mounting one end of each of said files in said hollow body for radial movement, the other end of each of said files being curved radially outward of said longitudinal axis, spring means biasing the curved ends of

said files toward the longitudinal axis, guide means at one end of said body adjacent said curved ends of said files for guiding a phillipshead screwdriver into alignment between said files.

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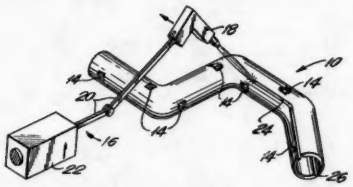
4,590,652

## METHOD FOR FABRICATING AN AIR GAP PIPE

Jon W. Harwood, Toledo, Ohio, assignor to APX Group Inc., Toledo, Ohio

Division of Ser. No. 541,709, Oct. 14, 1983, Pat. No. 4,501,302.
This application Nov. 14, 1984, Ser. No. 671,416
Int. Cl.[4] B21D *53/00*; B23P *15/26*; F16L *9/18*
U.S. Cl. 29—157 R 4 Claims



1. A method for forming a non-linear air gap pipe for use with an engine exhaust system, said air gap pipe comprising inner and outer pipes dimensioned to enable the inner pipe to be supported within the outer pipe with an air gap therebetween, said method comprising the steps of:

forming inwardly extending resilient dimples in the outer pipe extending inwardly a distance sufficient to support the inner pipe therein;

bending the inner and outer pipes into substantially identical non-linear configurations for use in the exhaust system;

providing a cutting apparatus selected from the group consisting of laser cutting apparatus and plasma are cutting apparatus, said cutting apparatus being movable and programmable to follow the nonlinear configuration of the bent outer pipe;

securely mounting the bent outer pipe in proximity to the cutting apparatus;

moving the cutting apparatus relative to the outer pipe to cut the outer pipe longitudinally in half to define first and second outer pipe halves;

supporting the inner pipe on the dimples of the outer pipe and intermediate the first and second outer pipe halves; and

welding the outer pipes halves together at selected locations to define an air gap pipe and to control the flow of heat from the air gap pipe.

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4,590,653

## TURBINE ROTOR HEATING, DISASSEMBLY, HANDLING AND REASSEMBLY METHOD AND APPARATUS

Adrian R. Ades, and George S. Schmidt, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 491,509, May 4, 1983, Pat. No. 4,567,649.
This application May 7, 1985, Ser. No. 731,216
Int. Cl.[4] B23K *3/00*; B23P *11/02, 19/00*; F27D *11/00*
U.S. Cl. 29—156.8 R 12 Claims

1. A method for radially centering a wheel on a shaft along at least one radial axis comprising the steps of:

radially displacing said wheel along said radial axis to a first position of contact between said wheel and said shaft;

radially displacing said wheel along said radial axis to a second position of contact between said wheel and said shaft, said second position being angularly spaced 180 degrees from said first position; and

radially displacing said wheel along said radial axis to a third position substantially midway between said first and second positions whereby said wheel is radially centered on said shaft along said radial axis.

2. A method for equalizing heating of a shaft during shrinkon of a heated wheel upon said shaft comprising:

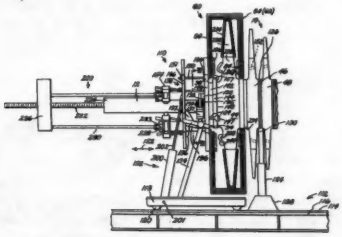
cyclically displacing said wheel along at least a first radial axis of said shaft between a first position of contact therebetween and a second position of contact therebetween, said first and second positions being angularly displaced 180 degrees apart; and

cyclically maintaining contact in said first and second positions for relative times effective to equalize said heating of said shaft at least at said first and second positions.

5. Apparatus for radially centering a wheel in a clearance on a shaft comprising:

indicating means affixed to one of said wheel and said shaft for indicating a displacement along at least one axis of the other thereof;

means for radially displacing said wheel along said at least one axis with respect to said shaft from a first tangential



contact at which said indicating means provides a first indication to a second tangential contact angularly spaced apart 180 degrees from said first tangential at which said indicating means provides a second indication contact;

said means for radially displacing including means for radially displacing said wheel to a radial position intermediate said first and second radial positions wherein said indicating means provides a third indication intermediate said first and second indications.

11. Apparatus for equalizing heating of a shaft during shrinkon of a heated wheel upon said shaft comprising:

means for cyclically displacing said wheel along at least a first radial axis of said shaft between a first position of contact therebetween and a second position of contact therebetween, said first and second positions being angularly displaced 180 degrees apart; and

means for cyclically maintaining contact in said first and second positions for relative times effective to equalize said heating of said shaft at least at said first and second positions.

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4,590,654

## METHOD FOR CONTROLLING AUTOMOTIVE VEHICLE ASSEMBLY AND A SYSTEM PERFORMING THE METHOD

Takatsugu Kajiura, Sayama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Dec. 23, 1983, Ser. No. 564,675
Int. Cl.[4] B23Q *15/13*; B07L *3/20*
U.S. Cl. 29—407 14 Claims

1. A method for controlling assembly of various types of assemblies in a single assembly line from a plurality of components, each of said components being variable in type in correspondence with the type of assembly to be assembled, the method comprising the steps of:

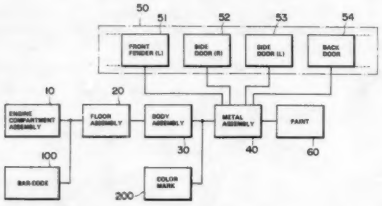
sequentially feeding information concerning type and identification of components to be assembled into final assemblies, in an order of assembly;

preparing first encoded signs according to the information and identification sequentially provided, each of said encoded signs containing information of the corresponding final assembly to be assembled and identification of the components to be assembled;

forming a base component to which other components are assembled to form the assembly of the type corresponding to that identified by said information and identification;

attaching one of said encoded signs on said base component;

applying a first visual marking for each of said other components, said first visual marking being variable for identifying the type of the corresponding individual component;




reading said attached encoded sign on said base component for recognizing identification of other components to be assembled to said base component for forming the final assembly of the type identified by said encoded sign;

applying a plurality of second visual markings on predetermined portions of said base component, each of said second visual markings identifying one component to be assembled to said base component and having said first visual marking identical thereto; and

selecting said other components, each having the said first visual marking identical to the corresponding second visual marking and assembling the selected components to said base component.

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**4,590,655**

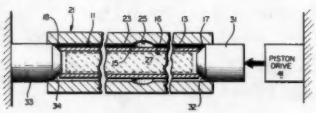
## METHOD FOR EXPANDING A TUBULAR MEMBER

**Laszlo Javorik, Oregon, Ill., assignor to Grotnes Metalforming Systems, Inc., Chicago, Ill.**

**Continuation-in-part of Ser. No. 574,282, Jan. 26, 1984. This application Jun. 24, 1985, Ser. No. 748,030**

**Int. Cl.[4] B23P** *17/00*

**U.S. Cl. 29—421 R** **31 Claims**




1. A method for expanding a tubular member in at least one direction transverse to the longitudinal axis of said member, said method comprising the steps of:

applying a compressive load to said member with said load being parallel to the longitudinal axis of said member;

and allowing said member to deform in said transverse direction substantially without the application of hydraulic pressure to the interior of said member and without buckling.

**4,590,656**

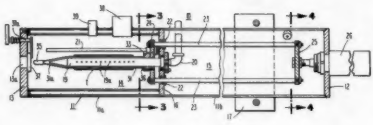
## TUBE EXPANDER AND FREEZER AND METHOD OF USING SAME

**Rolf H. Wieland, Norristown; Howard D. Brodbeck, Berwyn; Alan J. Paston, Dresher, all of Pa., and Casper C. Maucere, Randolph, N.J., assignors to MG Industries, Valley Forge, Pa.**

**Filed May 23, 1985, Ser. No. 737,240**

**Int. Cl.[4] B23P** *11/02, 19/02, 19/04*

**U.S. Cl. 29—450** **12 Claims**



1. Apparatus for securing a length of elastic flexible tubing having a predetermined internal diameter to a member having an external diameter larger than the predetermined internal diameter of the tubing comprising:

a flexible cage having a longitudinal portion dimensioned to fit within the length of flexible tubing said flexible cage comprises a plurality of wire-like members distributed around a longitudinal axis and connected together at one of their ends along said axis, the opposite ends of said wire-like members being attached to a base around the circumference of an opening therethrough, said opening having its center on said longitudinal axis and having a diameter greater than the maximum diameter of said insertable means;

means insertable into said longitudinal portion to expand the external diameter of said longitudinal portion to a diameter greater than the predetermined internal diameter of the flexible tubing;

means for producing relative movement between said insertable means and said flexible cage to expand said longitudinal portion and the length of flexible tubing thereon to an expanded state so that the internal diameter of the length of flexible tubing is greater than external diameter of the member to which the length of flexible tubing is to be secured; and

means for applying a cooling media to the length of flexible tubing at a temperature adequate to temporarily freeze the length of flexibletubing in an expanded state while positioned on said flexible cage and said insertable means.

12. Apparatus for securing a length of elastic flexible tubing having a predetermined internal diameter to a member having an external diameter larger than the predetermined internal diameter of the tubing comprising:

a housing having a chamber supporting a mandrel therein;

a flexible cage comprising longitudinal wire-like members secured together at their ends and having a longitudinal portion dimensioned to fit within the length of flexible tubing;

means for moving said flexible cage into said chamber and relative to the mandrel to expand said longitudinal portion of said flexible cage and the length of flexible tubing thereon to an expanded state so that the internal diameter of the length of flexible tubing is greater than the external diameter of the member to which the length of flexible tubing is to be secured; and

means for applying a cooling media to the length of flexible tubing at a temperature adequate to temporarily freeze the length of flexible tubing in an expanded state while positioned on said flexible cage and mandrel.

4,590,657

## METHOD OF CONSTRUCTING AN ASSEMBLY WITH A ROLLER BEARING TO AVOID FRETTING CORROSION

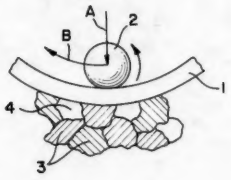
Evert van Amerongen, Bennekom, Netherlands, assignor to SKF Industrial Trading & Development Company B.V., Netherlands

Filed Apr. 12, 1984, Ser. No. 599,330

Claims priority, application Netherlands, May 13, 1983, 8301723

Int. Cl.[4] B23P *9/00;* B21D *53/12;* B21K *1/05;* F16C *27/00*

U.S. Cl. 29—458 4 Claims




1. In a method for constructing a bearing assembly having at least two metal elements in rolling contact, the surfaces of said metal elements normally having open cavities therein which tend to cause relative sliding movement between said metal elements during use thus causing fretting erosion between said metal elements; the improvement which comprises:

fixedly adhering a layer of a homogeneous elastic material to the surface of at least one of said elements in rolling contact with the other metal element;

said layer of homogeneous elastic material having density and smoothness such that it contains fewer and smaller open cavities than the surface of the metal element to which it is adhered;

whereby said reduction in the number and size of open cavities in the layer of elastic material increases the coefficient of friction between the surfaces in rolling contact due to full intimate contact therebetween,

thus substantially eliminating relative sliding movement between said elements in rolling contact with substantial elimination of fretting erosion of the surfaces thereof.

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4,590,658

## TUBE WALL THICKNESS MEASUREMENT

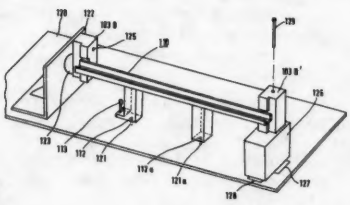
Yutaka Funyu; Tadashi Okumura, both of Handa; Asao Monno, and Masami Shimizu, both of Hino, all of Japan, assignors to Fuji Electric Company, Ltd., Japan

Division of Ser. No. 274,531, Jun. 17, 1981. This application Aug. 4, 1983, Ser. No. 520,153

Claims priority, application Japan, Jun. 19, 1980, 55-82162; Jun. 19, 1980, 55-82163; Jun. 25, 1980, 55-85213; Jun. 27, 1980, 55-86654; Sep. 26, 1980, 55-132986

Int. Cl.[4] B23Q *3/00*

U.S. Cl. 29—464 2 Claims



1. A method of aligning two collimator members used in radiation beam scanning equipment for tube wall thickness measurement, each of the collimator members comprising two separable parts with facing surfaces, each part having a generally T-shaped depression and two flat protrusions formed on its respective surface, to define a slit between the two parts through which the radiation beam passes when the two parts are assembled together with the protrusion of one part contacting the depression of the other part, wherein the equipment comprises an aligning ruler including a straight bar member both ends of which are precisely machined and forming ruling surfaces which fit the surface of the collimator members defining the slit, the method further comprising the steps of separating the collimators into their respective two parts, placing the ruler in a position contacting the respective first parts of the collimators along a predetermined line parallel to the axis of the radiation beam, placing each collimator first part such that the surface defining the slit are just in contact with the respective ruling surfaces of the ruler so that the collimators are thereby properly aligned, thereafter removing the ruler, and coupling the respective second parts of the collimators back with their respective first parts.

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4,590,659

## APPARATUS FOR INSERTING SQUARE PINS INTO A PRINTED CIRCUIT BOARD

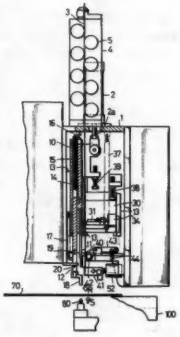
Hiroshi Yagi, and Yoshio Harada, both of Tokyo, Japan, assignors to TDK Corporation, Japan

Filed Apr. 19, 1983, Ser. No. 486,423

Claims priority, application Japan, Apr. 21, 1982, 57-66948; May 4, 1982, 57-63835[U]; May 8, 1982, 57-66841[U]; May 15, 1982, 57-70968[U]

Int. Cl.[4] B23D *15/04;* H05K *13/04*

U.S. Cl. 29—564.6 8 Claims



1. Apparatus for inserting square pins into openings in a printed circuit board, comprising:

a frame;

a master cylinder mounted on said frame;

a main slider mounted on said frame and coupled to said master cylinder for reciprocating movement including advancing and retracting strokes;

a push rod mounted on said main slider for reciprocating movement therewith;

a slide bar coupled to said main slider and adapted to be advanced therewith along at least a portion of its advancing stroke;

guide means mounted on said slide bar;

a chuck slider mounted on said frame for reciprocating movement and means for coupling said chuck slider and said main slider to advance said chuck slider along at least a portion of the advancing stroke of said main slider;

chuck means mounted on said chuck slider for clamping a length of square pin-forming wire;

a fixed cutter mounted on said frame;

a movable cutter mounted for movement on said frame for cutting the square pin-forming wire in cooperation with

said fixed cutter to form a square pin, said movable cutter including first means for positively grasping said holding the square pin cut from the square pin-forming wire;

said guide means including second means for holding the square pin;

means for laterally moving the square pin positively grasped and held in said first holding means of said movable cutter to a transfer position over and axially aligned with said second holding means of said guide means; and wherein

said push rod is aligned with said transfer position and said second holding means of said guide means so that upon movement of said push rod during the advancing stroke of said main slider, said push rod transfers the square pin into said second holding means of said guide means;

wherein said means for coupling said chuck slider for advancing the same comprise means for moving said chuck slider during the movement of said push rod as the latter transfers the square pin into said second holding means of said guide means and such that an end region of the square pin-forming wire is situated in said first holding means of said movable cutter;

wherein said movable cutter includes a body member and wherein said first holding means comprise a square pin receiving groove formed in a surface of said movable cutter body and means for at least partially covering said receiving groove, and wherein said means for moving the square pin held in said first holding means to said transfer position include means for advancing said movable cutter to a position wherein said receiving groove is aligned with said push rod; and

wherein said means for at least partially covering said receiving groove comprises a covering member movably mounted to said movable cutter and wherein said push rod includes a tapered cam portion adapted to move said covering member, upon contacting the same during the advancing movement of said push rod, to a position to allow said movable cutter to retract.

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**4,590,660**

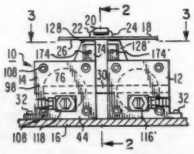
## COMPONENT LEAD PROCESSING DEVICE

**Wojciech Starski, Lexington, Ky., assignor to RCA Corporation, Princeton, N.J.**

**Filed Sep. 12, 1983, Ser. No. 531,242**

**Int. Cl.[4] H05K *3/30***

**U.S. Cl. 29—566.3** **12 Claims**



1. A component lead processing device comprising:

a housing having a cavity;

a piston body in said cavity for reciprocating in first and second directions in said cavity, said piston body including first and second aligned pistons each in sliding sealed engagement with the cavity walls at opposite respective piston body ends;

a lead processing member attached to said piston body between said first and second pistons including means for receiving said lead and for processing said received lead when the member is moved; and

control means responsive to the received lead for selectively applying pressurized gas to one and then the other of said pistons to move the piston body in each of two opposite directions and thereby move the lead processing member in said directions for processing said lead.

**4,590,661**

## HOBBING MACHINE TOOL CHANGER HAVING VERTICALLY AND HORIZONTALLY MOVABLE JAWS

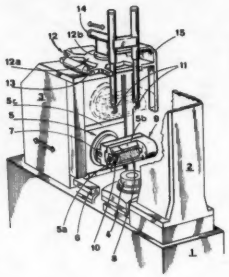
**Alessandro Lunazzi, Bologna, Italy, assignor to CIMA S.p.A., Villanova di Castenaso, Italy**

**Filed Jul. 20, 1984, Ser. No. 633,044**

**Claims priority, application Italy, Nov. 3, 1983, 3607 A/83**

**Int. Cl.[4] B23Q *3/157***

**U.S. Cl. 29—568** **4 Claims**



1. In equipment for automatically changing tools on hobbing machines of the type including a base plate, first and second uprights each of which having an upper surface and a lower surface and connected to said base plate, a work head supported on the first upright and a cutter head for cooperation with said work head supported on the second upright, base guides affixed to said base plate for cooperation with the second upright, the second upright being slidable in said base guides in the direction of the first upright, the cutter head being rotatable around a horizontal axis parallel to said base guides, and a hob horizontally supported at the extremities thereof in the cutter head for cooperation with said work head, the improvement comprising an independent frame fixable to one of the first and second uprights above the upper surface thereof, tool storage space supported by said independent frame and placed above the upright that supports the cutter head, grasping means supported by said independent frame and being rectilinearly movable in a vertical plane parallel to a frontal vertical plane of the cutter head and being displaceable from a virtually horizontal plane level with the cutter head to a plane level with the tool storage space and above the upper surface of the upright supporting the cutter head, guide means provided in the cutter head parallel to the axis of said hob so as to facilitate cooperation with said grasping means, and a support for at least one extremity of said hob being slidable inside the cutter head along the guide means thereof, said support being displaceable, without being withdrawn from the cutter head, by an amount sufficient to free the two extremities of said hob from the cutter head, said grasping means comprising a pair of grasping members movable together in an operating cycle of said equipment to disengage said hob from the cutter head and place the same in the tool storage space and in a reverse operating cycle carrying a new hob from the tool storage space to be secured to the cutter head.

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**4,590,662**

## TOOL CHANGING MACHINE OF MACHINE TOOL

**Kenji Norota, Machida, Japan, assignor to Makino Milling Machine Co., Ltd., Tokyo, Japan**

**Filed Aug. 29, 1983, Ser. No. 527,302**

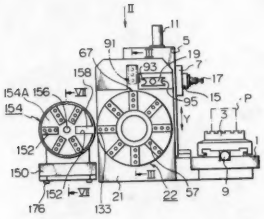
**Claims priority, application Japan, Sep. 3, 1982, 57-152600; Apr. 15, 1983, 58-65607**

**Int. Cl.[4] B23Q *3/157***

**U.S. Cl. 29—568** **4 Claims**

1. A machine for tool changing between a machine tool with a spindle, having a main tool magazine which has a plurality of

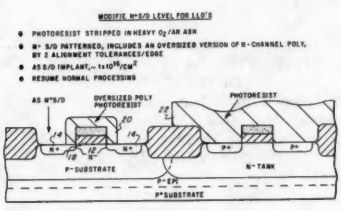
cartridges each having a plurality of tool sockets for receiving tools, and an auxiliary tool magazine outside the machine tool having cartridge receiving chambers, comprising a carriage for moving the auxiliary tool magazine so as to come close to or away from the machine tool, means for transferring the cartridges between the main tool magazine and the auxiliary tool magazine, said auxiliary tool magazine being supported by the carriage, said main tool magazine comprising a rotatable magazine body in which the cartridges are arranged radially with respect to the rotation of the magazine body, means for indexing the main tool magazine into an index position for effecting a tool change between the spindle of the machine tool and the main tool magazine and into a second index position for effecting a tool change between the main tool magazine and the auxiliary tool magazine, said auxiliary tool magazine having a circular body in which the cartridge receiving chambers are formed to radially extend, and means for indexing the cartridges into a predetermined angular position defining a cartridge receiving and transferring position which is in alignment with the index position of the main tool magazine.



## 4,590,663
## HIGH VOLTAGE CMOS TECHNOLOGY WITH N-CHANNEL SOURCE/DRAIN EXTENSIONS

**Roger A. Haken, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation-in-part of Ser. No. 344,588, Feb. 1, 1981, Pat. No. 4,442,591. This application Feb. 23, 1983, Ser. No. 469,074**
**The portion of the term of this patent subsequent to Apr. 17, 2001, has been disclaimed.**
**Int. Cl.[4] H01L** *21/265, 21/76*
**U.S. Cl. 29—571** **10 Claims**




1. A method for fabricating CMOS integrated circuits, comprising the steps of:

providing a semiconductor substrate having a first conductivity type;

defining a plurality of moat regions on the surface of said substrate;

introducing impurities into the surface of said substrate, to form a plurality of second-type tank regions;

depositing and patterning a first insulated conductive layer to define gates in selected first locations;

introducing a small concentration of an N-type impurity to form P-channel source/drain regions in selected second locations;

forming a masking layer to cover selected P-channel devices, and also to cover portions of said first insulated conductive layer in at selected third locations to form high-voltage N-channel transistors, said masking layer being wider than said portions of said first insulated conductive layer at said said selected third locations, whereby said masking layer covers portions of said substrate horizontally adjacent to said portions of said first insulated conductive layer at said selected third locations;

introducing a large concentration of an N-type dopant into a selected set of said second locations, said set including the set of locations horizontally adjacent to said third locations, to form N-type source/drain regions;

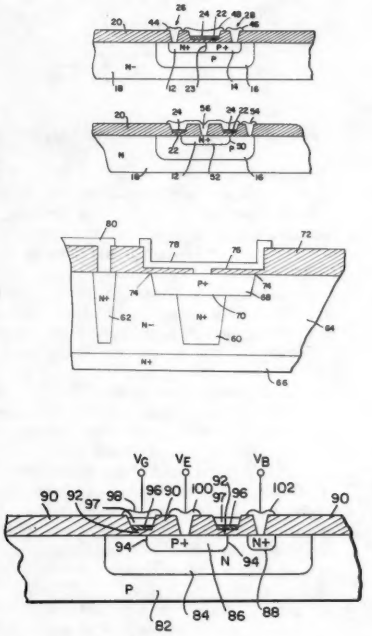
whereby portions of said small-concentration introduction of N-type impurities form lightly doped regions in said set of locations horizontally adjacent to said third locations between the respective channel regions of said high-voltage N-channel transistors and said respective source/drain regions thereof;

wherein said high-voltage N-channel transistors each comprise a channel length which is not less than 3 microns.

## 4,590,664
## METHOD OF FABRICATING LOW NOISE REFERENCE DIODES AND TRANSISTORS

**John S. Prentice, Palm Bay, and Gabriel J. Uscategui, Melbourne, both of Fla., assignors to Harris Corporation, Melbourne, Fla.**

**Filed Jul. 29, 1983, Ser. No. 518,598**
**Int. Cl.[4] H01L** *21/04, 29/40*
**U.S. Cl. 29—571** **27 Claims**




1. A method of fabricating a diode comprising:

forming a P region and an N region in the surface of a substrate to be contiguous along a vertical diode junction extending down from said surface;

oxidizing said surface to form a thick oxide;

removing portions of said thick oxide to expose only said vertical junction and immediately adjacent arears of said P region and said N region at said surface and to remove contaminants;

forming a thin oxide layer on said exposed surface; and

forming a contaminant shield layer on said thin oxide over said vertical junction at said surface to protect said diode vertical junction.

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**4,590,665**

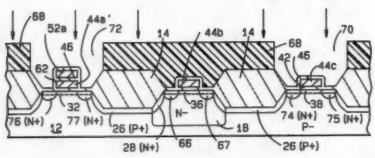
## METHOD FOR DOUBLE DOPING SOURCES AND DRAINS IN AN EPROM

**Alexander H. Owens, Pennington, N.J.; Mark A. Halfacre, Horsham, Pa.; Wing K. Huie, North Wales, Pa., and David S. Pan, Doylestown, Pa., assignors to Solid State Scientific, Inc., Willow Grove, Pa.**

**Filed Dec. 10, 1984, Ser. No. 680,199**

**Int. Cl.[4] H01L *29/78*; G11C *11/40***

**U.S. Cl. 29—571** **3 Claims**




1. A method for making an EPROM integrated circuit comprising

(a) forming an insulative layer over a silicon substrate, the region of said substrate at which an EPROM device is to be formed having a conductivity of one type;

(b) forming a floating gate over said isolation layer at a central portion of a region of said substrate at which said EPROM device is to be formed;

(c) implanting ions of a first kind through said insulating layer into said substrate, at two subregions within said EPROM region that are on opposite sides of and adjacent to said floating gate to form the source and drain of said EPROM device;

(d) implanting ions of a second kind through said insulating layer into said substrate at said two subregions, wherein said first and second kind are of the opposite conductivity type relative to said EPROM substrate region, and wherein said second kind of ions has a greater coefficient of diffusion in silicon than do ions of said first kind;

(e) forming a mask over said substrate, said mask having an aperture for exposing a portion of said EPROM device region through which said implantings are selectively effected and self aligned with said floating gate at said two sub-regions; and

(f) heating said substrate to cause said first kind ions to form a drain-core and a source-core having a high impurity concentration and to cause said ions of said second kind to extend laterally about 0.1 micron under said floating gate from said cores to form a relatively low impurity concentration region beyond said high concentration core, to shorten the channel length to less than the width of said floating gate between said source and drain, and to improve the programing efficiency of said EPROM device.

**4,590,666**

## METHOD FOR PRODUCING A BIPOLAR TRANSISTOR HAVING A REDUCED BASE REGION

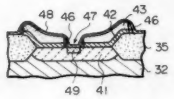
**Hiroshi Goto, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

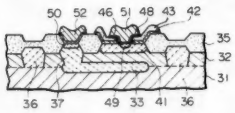
**Division of Ser. No. 425,647, Sep. 28, 1982, abandoned. This application Jan. 31, 1985, Ser. No. 696,884**

**Claims priority, application Japan, Sep. 28, 1981, 56-151987**

**Int. Cl.[4] H01L *21/265, 21/22***

**U.S. Cl. 29—578** **5 Claims**




1. A method for producing a bipolar transistor having a base region of a first conductivity type comprising the steps of:

(a) depositing a high-melting-point metal selected from the group consisting of gold, molybdenum, and tungsten;

(b) forming a first insulating layer on the base electrode, the first insulating layer and the base electrode forming a laminated layer;

(c) selectively etching the laminated layer to form an opening having sides, in which a portion of the base region is exposed;

(d) forming a second insulating layer, having a thickness greater than that of the laminated layer, formed on the laminated layer and the exposed portion of the base region;

(e) anisotropically etching the second insulating layer, leaving portions of the second insulating layer along the sides of the opening of the laminated layer; and

(f) introducing impurities of a second conductivity type opposite to the first conductivity type, into the base region by using the portions of the second insulating layer as a mask, to form an emitter region.

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**4,590,667**

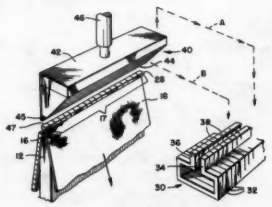
## METHOD AND APPARATUS FOR ASSEMBLING SEMICONDUCTOR DEVICES SUCH AS LEDS OR OPTODETECTORS

**Ralph E. Simon, Clifton, N.J., assignor to General Instrument Corporation, New York, N.Y.**

**Filed Aug. 22, 1984, Ser. No. 643,064**

**Int. Cl.[4] H01L *21/56, 21/60***

**U.S. Cl. 29—589** **13 Claims**




1. A method for mass producing semiconductor devices comprising the steps of:

providing a thin, non-stretchable membrane,
mounting a wafer containing multiple semiconductor components to said membrane,
dividing said wafer into a plurality of dice arranged in an abutted end-to-end relationship in a plurality of parallel rows,
disposing said membrane over a knife-edge to sequentially remove a portion of each die in each row simultaneously from said membrane as it passes over said knife-edge,
transferring a row of said dice removed from said membrane by the knife-edge to a position in alignment with a corresponding row of leadframe members, and then
simultaneously attaching each individual die in said removed row of dice to the leadframe member corresponding thereto in the row of leadframe members.

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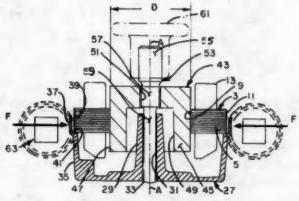
**4,590,668**

## METHOD OF AND APPARATUS FOR ASSEMBLING DYNAMOELECTRIC MACHINE

C. Theodore Peachee, Jr., St. Louis County, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed May 28, 1985, Ser. No. 738,254
Int. Cl.[4] H02K *15/16*
U.S. Cl. 29—596 6 Claims



1. The method of assembling a dynamoelectric machine, the latter comprising a stator including a core constituted by a stack of laminations of suitable ferromagnetic material, said core having an outer surface and a central bore extending longitudinally therethrough, a rotor including a rotor body and a shaft coaxial with respect to said rotor body and extending out beyond said rotor body, the latter being sized to fit closely within said bore but to be freely rotatable within said bore with a substantially uniform air gap of predetermined width between the inner surfaces of said core defining said bore and said rotor body, said bore having a minimum predetermined diameter, and at least one bearing support having bearing means therein for receiving and journaling said rotor shaft, said bearing means having a bearing bore, said bearing support being engagable with said core such that said bore, said rotor body, said rotor shaft, and said bearing bore are substantially coaxial, wherein the method comprises the steps of:

inserting a rotor tool into said stator bore, said rotor tool having a tool body with an outer diameter substantially equal to or slightly less than said minimum predetermined diameter of said bore, said tool further having a central pin;

inserting said central pin of said rotor tool into said bearing bore of said bearing support, the latter having portions thereof disposed on the outside of said outer core surface; and

with said tool body received in said stator bore and with said central pin received in said bearing bore of said bearing support, magnetically deforming said portions of said bearing support inwardly onto said outer core surface for securement of said bearing support to said core such that said bearing bore and said stator bore are substantially coaxial.

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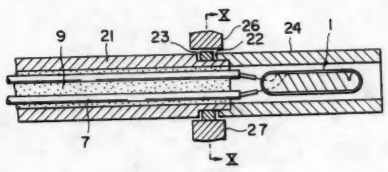
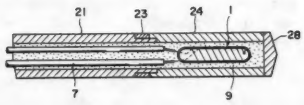
**4,590,669**

## METHOD OF PREPARING RESISTANCE THERMOMETER

Iku Imamura, Fujimi, Japan, assignor to Netsushin Co., Ltd., Tokyo, Japan

Filed Nov. 13, 1984, Ser. No. 670,940
Int. Cl.[4] H01C *17/02*
U.S. Cl. 29—612 5 Claims





1. A method of preparing a resistance thermometer, comprising the steps of:

(a) providing

a first tubular metallic sheath containing therewithin electrical conductors insulated from each other and from said first sheath by an electrical insulator and including a first portion with a first outer diameter, and a second portion with a second outer diameter which is greater than said first diameter,

a metallic ring having an outer diameter greater than that of said second outer diameter and an inner diameter dimensioned so that said first portion of said first sheath may be inserted into said metallic ring,

a second tubular metallic sheath having substantially the same outer diameter as said second outer diameter and including a first portion with a first inner diameter so that said first portion of said first sheath can be inserted into said first portion of said second sheath with a close fit, and

a resistance temperature detector element with terminal leads;

(b) joining the terminal leads of said resistance temperature detector element to associated conductors supported in said first sheath;

(c) putting said metal ring on said first portion of said first sheath;

(d) inserting said first portion of said first sheath into said first portion of said second sheath with said resistance temperature detector element being accommodated in said second sheath;

(e) ramming said metallic ring radially inwardly so that said first and second sheaths are integrally connected by pressure welding;

(f) filling said second sheath with an electrical insulator from the open end thereof to fix said resistance temperature detector element in position; and

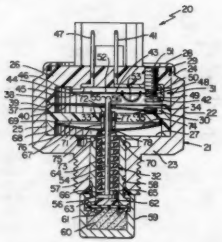
(g) attaching a closure to the open end of said second sheath.

4,590,670

## METHOD OF MAKING AN ELECTRICAL SWITCH

Frank Payne, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 545,518, Oct. 26, 1983, Pat. No. 4,479,039.
This application Jul. 27, 1984, Ser. No. 635,216
Int. Cl.[4] H01H *11/04*
U.S. Cl. 29—622 14 Claims



1. In a method of making an electrical switch construction comprising the steps of providing a housing means, disposing a pair of electrical switching units in said housing means, disposing a condition responsive actuator means in said housing means so as to be operatively associated with said units to serially operate said units as a condition being sensed by said condition responsive actuator means respectively reaches two different predetermined conditions, forming said actuator means to comprise an axially movable plunger for operating one of said units and a snap disc for operating the other of said units when snapped overcenter, and forming said actuator means to have a spring means operatively associated with said plunger and said snap disc to move said snap disc overcenter when said plunger is moved to a certain axial position thereof by said actuator means sensing one of said conditions, the improvement comprising the steps of forming said actuator means to have a tubular member, telescopically disposing said tubular member on said plunger so as to be disposed intermediate said snap disc and said other unit and normally be movable relative to said snap disc and said other unit, and forming said tubular member to be of a length so as to operatively interconnect said snap disc to said other unit with said tubular member when said snap disc is snapped overcenter.

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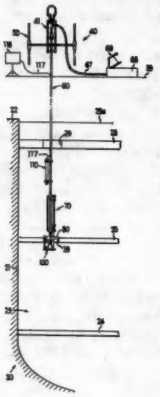
4,590,671

## TOOL FOR REMOVING SPLIT PIN REMNANTS FROM A NUCLEAR REACTOR VESSEL

Stephanie M. Havoic-Conroy, N. Huntingdon, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 29, 1984, Ser. No. 614,175
Int. Cl.[4] B23P *19/00*
U.S. Cl. 29—723 20 Claims

1. A tool for removing from anchor bores in the upper core plate of a nuclear reactor vessel, anchor pin remnants which may be broken from guide tube assemblies upon withdrawal thereof from large seating apertures adjacent to the anchor bores in the upper core plate, said tool comprising: support means dimensioned to fit through a seating aperture, a pin driving member carried by said support means, means for lowering said support means through a seating aperture to a use position beneath the upper core plate with the pin driving member in registry with an adjacent anchor bore, and motive



means for moving said pin driving member upwardly into the anchor bore to drive the anchor pin remnant therefrom.

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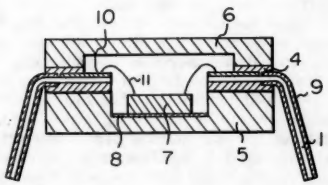
4,590,672

## PACKAGE FOR ELECTRONIC DEVICE AND METHOD FOR PRODUCING SAME

Shokichi Shimizu, Kamakura; Hideji Aoki, Machida; Susumu Kida, Tokyo, and Yuki Kanazawa, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jul. 20, 1982, Ser. No. 400,013
Claims priority, application Japan, Jul. 24, 1981, 56-115901
Int. Cl.[4] H01R *43/00;* H01L *23/48*
U.S. Cl. 29—827 9 Claims




1. A process of producing a package having an enclosure for accommodating an electronic device, comprising the steps of:

electroplating a layer of a metal selected from the platinum group metals as an underplate on the outerlead area of an iron and nickel-containing alloy lead frame, excluding the end portion of the innerlead area thereof;

electroplating a layer of gold or silver as a final layer on said underplate;

bonding said electronic device in the enclosure;

connecting said electronic device with said end portion of the innerlead area by means of wires; and

thereafter, sealing the enclosure with fused glass in such a manner that said outerlead area of said lead frame extends out of said glass.

7. A package for an electronic device, comprising an iron and nickel-containing alloy lead frame of which outerleads have at least a final layer electroplated with gold or silver and of which innerleads are partially embedded in glass, said final layer on the outerleads extending within the glass, said final layer having an underplate which is electroplated with a metal

selected from the platinum group metals on said outerleads, excluding the end portion of said innerleads, said underplate extending within the glass.

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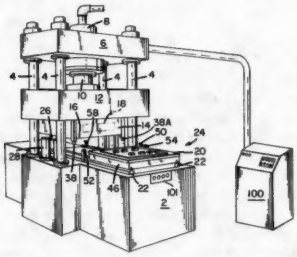
4,590,673

## FORCE-FITTING COMPONENTS INTO A WORKPIECE

Bryan J. Dornes, Hershey; Jon F. Kautz, Camp Hill; Edward J. Paukovits, Jr., Hummelstown; Richard V. Spong, Etters; Robert J. Talarico, Camp Hill, and Harry G. Prescott, Hershey, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 11, 1984, Ser. No. 618,983
Int. Cl.[4] H05K *3/00*; B23P *19/00*
U.S. Cl. 29—845 10 Claims



1. A method of force-fitting components into a workpiece, the method comprising the steps of:

locating in alignment with a magnetic chuck on a press platen, a dummy workpiece having tool supports fixed thereto in a predetermined array with predetermined spacing therebetween and with a component insertion tool surmounting each tool support;

moving the platen towards the workpiece to secure each tool magnetically to the chuck;

withdrawing the platen thereby to remove each tool from the tool support surmounted thereby;

replacing the dummy workpiece by an actual workpiece with components arranged thereon in said predetermined array and with said predetermined spacing therebetween; and

moving the platen towards the dummy workpiece to cause each tool on the chuck to force-fit the corresponding component into the actual workpiece.

4. A hydraulic press comprising a base; a press platen mounted above the base; a chuck on the platen; a flat magnetic tool supporting surface on the chuck and facing the base; a worktable slidably mounted on the base for movement between a work station and a loading station thereon; a flat, workpiece supporting surface on the worktable; means on the base supporting the platen for reciprocating movement towards and away from the base with said tool supporting surface and said workpiece supporting surface in parallel relationship; a hydraulic ram mounted on said supporting means and connected to the platen, for driving the platen through a working stroke towards the base and a return stroke away therefrom; means on the base and connected to the worktable for driving the worktable between said work station at which said workpiece supporting surface faces said tool supporting surface and said loading station which is laterally displaced from the platen; and cooperating means on the platen and the work table for automatically laterally aligning said workpiece supporting surface with said tool supporting surface during the working stroke of the platen when the worktable is at the work station.

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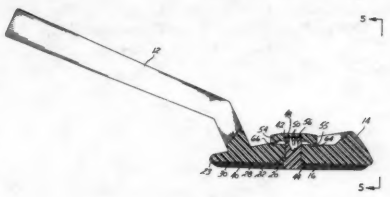
4,590,674

## SHAVING IMPLEMENT HAVING ADJUSTABLE ANNULAR BLADES

Frederick R. Harper, P.O. Box 6615, Jeddah 21452, Saudi Arabia

Filed Dec. 19, 1984, Ser. No. 683,461
Int. Cl.[4] B26B *21/22*, *21/28*
U.S. Cl. 30—49 6 Claims



1. A shaving implement comprising a handle terminating in a head, a planar face-contacting plate member rotatably secured to said head, a first annular blade positioned between said head and said planar face-contacting plate member, and means connecting said blade to said planar face-contacting plate member wherein the blade is rotatable in conjunction with the plate member.

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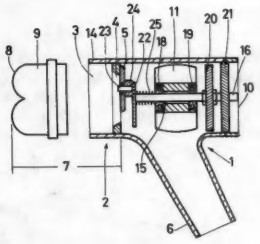
4,590,675

## HAIR CUTTING APPARATUS

Jan T. Louw, 226 Market St., Fairlands, Transvaal Province, South Africa

Filed Nov. 26, 1984, Ser. No. 674,587
Claims priority, application South Africa, Nov. 30, 1983, 83/8929; Aug. 16, 1984, 84/6362
Int. Cl.[4] B26B *19/44*, *19/20*
U.S. Cl. 30—133 1 Claim



1. A haircutting apparatus comprising a means defining a flow path having an inlet and an outlet, said outlet being adapted for connection to a section device for generating an air stream through said flow path; a cutting zone in said flow path; and a haircutting device located in said cutting zone comprising a turbine rotor arranged in said flow path to be rotated by the air stream and a rotary cutter having a stator blade and a rotor blade, said rotor blade coupled to and rotably driven by said turbine blade, said stator blade having an annular cutting member with an inner circular cutting edge; said rotor blade having a disc cutting member abutting said stator blade and having an outer cutting edge; said disc cutter member having a central axis, said annular cutter member having an axis, said axis of said disc cutter member being offset from the axis of said annular cutter member; and the axis of said disc cutting member being movable in a circular path about said axis of said annular cutter member such that said inner and outer cutting edges cooperate in a continuous scissor-like manner so as to cut

hair which has been drawn into the inlet of said flow path by the section device.

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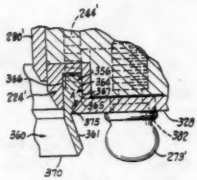
4,590,676

## BONING AND TRIMMING KNIFE AND HOUSING

Louis A. Bettcher, Amherst, Ohio, assignor to Bettcher Industries, Inc., Birmingham, Ohio

Division of Ser. No. 330,553, Dec. 14, 1981, Pat. No. 4,509,261.
This application Mar. 28, 1985, Ser. No. 717,491
Int. Cl.[4] A22C *17/04*
U.S. Cl. 30—276 15 Claims



4. A hand knife for cutting meat and the like comprising a handle; a ring blade housing at one end of the handle having an acruate recess that opens toward an axial end of the housing; a continuous ring blade rotatable in the housing, said blade having gear teeth received in said recess, a cutting portion extending from the housing, and a circular flange by which the blade is retained in the housing recess; a pinion carried by the handle and engageable with the blade; an axially elongated member that secures the housing to the handle and covers the pinion; and means including a blade retainer connected to the handle and located to in part oppose the blade flange to retain the blade in the housing without clamping the blade against the housing.

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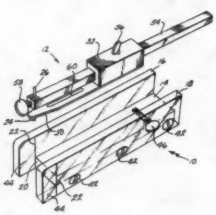
4,590,677

## ALIGNMENT GAUGE FOR SCRIBER TOOL

Paul J. Kopp, 8071 Lamplight Dr., Jenison, Mich. 49428

Filed Nov. 8, 1984, Ser. No. 669,386
Int. Cl.[4] B43L *13/00*
U.S. Cl. 33—42 14 Claims



1. An alignment gauge for accurately adjusting a scriber tool having an index adjustable relative a scribing needle, comprising:

a receipt means for receiving the scriber tool, said receipt means having a lip means for positive receipt of said index, said lip means including a positioning surface for positive engagement with said index; and

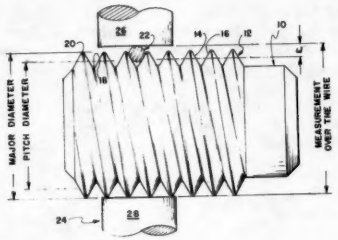
a sighting element coupled with said lip means, said sighting element being aligned with said positioning surface, whereby said scribing needle can be quickly adjusted.

4,590,678

## TECHNIQUE FOR DETERMINING THREAD ACCURACY

Alonso Arredondo, 4510 Christie, Corpus Christi, Tex. 78415

Filed Dec. 3, 1984, Ser. No. 677,238
Int. Cl.[4] G01B *5/08, 5/16*
U.S. Cl. 33—199 R 1 Claim




1. A method of determining, with a hand held micrometer of the type having an anvil, a spindle, a mechanism for manuipulating the spindle relative to the anvil and means for displaying the distance between the anvil and spindle, whether the threads of a threaded member are to tolerance, the threads comprising a root, a crest and a pair of flanks connecting the root and crest and defining therebetween an acute angle, the method comprising selecting a single wire of circular cross-sectional size as a function of the number of threads per unit length of the threaded member in accordance with the relationship wherein $W \times N$ is substantially constant, W is the wire diameter and N is the number of threads per unit length of the threaded member; placing the single wire in tangential engagement with the flanks of the thread at the pitch diameter, the wire being of sufficient size to extend above the top of the thread crest; placing the threaded member and wire in the hand held micrometer with the anvil and spindle engaging the wire on one side and the thread crest on the other side and measuring the distance between the thread crest and the edge of the wire extending above the top of the thread crest; and comparing the measured distance to a calculated value M wherein $M = D + 0.75W - 0.32475/N$ wherein D is the major diameter of the threaded member, W is the wire diameter and N is the number of threads per unit length of the threaded member.

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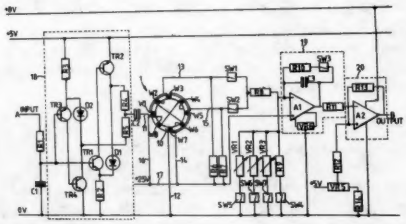
4,590,679

## COMPASS SYSTEMS

Rodney Livings, Havant, and Harjit Singh, Portsmouth, both of England, assignors to Nautech Limited, Portsmouth, England

Filed Dec. 20, 1983, Ser. No. 563,446
Claims priority, application United Kingdom, Dec. 30, 1982, 8236957
Int. Cl.[4] G01C *17/28*
U.S. Cl. 33—361 10 Claims



8. A compass system comprising:

a fluxgate, said fluxgate having a first and second detection coil;

means for applying an alternating drive signal to said fluxgate, thereby to generate first and second output pulses from said first and said second detection coils respectively; and

an analyser for analysing said first and second output pulses, the analyser including an integrator and means for applying a first predetermined number of said first output pulses and a second predetermined number of said second output pulses sequentially to said integrator, whereby the integrator generates first and second integrator outputs corresponding respectively to said first predetermined number of said first output pulses and said second predetermined number of said second output pulses, said analyser being adapted to analyse said first and second integrator outputs to determine said orientation of said fluxgate.

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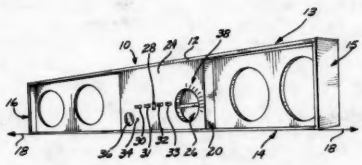
**4,590,680**

## ELECTRONIC INCLINATION SENSING DEVICE

**Michael T. Hanchett, Edmonds; Patrick B. Stone; Kurt W. Bujack, both of Lynnwood, and Monte S. Strand, Seattle, all of Wash., assignors to Technical Designs Incorporated, Edmonds, Wash.**

**Filed Jun. 13, 1984, Ser. No. 620,035**
**Int. Cl.[4] G01C 9/10**
**U.S. Cl. 33—366** **29 Claims**




1. A device capable of sensing information relating to the orientation of a selected direction with respect to the horizontal, comprising:

a housing;

a chamber mounted in the housing, the chamber including an upper wall and being partly filled with liquid so as to form a bubble in the chamber, the upper wall being shaped so as to permit the bubble to move with respect to the upper wall when the orientation of the upper wall with respect to the horizontal is changed;

a source of electromagnetic radiation, the source of radiation being positioned on a first side of the chamber and being adapted to direct at least some of the radiation in a substantially vertical direction through a portion of the chamber containing the bubble to thereby form a shadow of the bubble on a second side of the chamber opposite to the first side;

sensor means comprising at least two detectors positioned on the second side of the chamber, the sensor means being adapted to detect the shadow of the bubble caused by the radiation passing through the chamber and to produce an output signal having a characteristic from which the position of the bubble with respect to the upper wall may be determined over a range of positions that includes all positions between the first and second detectors; and

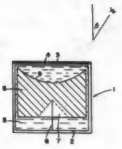
positioning means for positioning the housing with respect to the selected direction such that the orientation of the upper wall with respect to the selected direction is known.

**4,590,681**

## LEVEL BASED ON MOIRE EFFECT WITH AMBIENT LIGHT

**Oded Kafri, Beer-Sheva; Aminadav Livnat, and Eliezer Keren, both of Arad, all of Israel, assignors to The State of Israel, Atomic Energy Commission, Nuclear Research Center Negev, Beer-Sheva, Israel**

**Filed Dec. 27, 1984, Ser. No. 686,923**
**Claims priority, application Israel, Jan. 2, 1984, 70596**
**Int. Cl.[4] G01C 9/20**
**U.S. Cl. 33—378** **6 Claims**



1. A level comprising a sealed casing holding a liquid and having a flat bottom end and substantially parallel thereto, a light admissive top section bearing a periodic grating of alternating transparent and opaque stripes, said periodic grating comprising, in diffusive light, means for producing together with its virtual mirror image a moire fringe pattern; a float in said liquid inside a compartment of said casing underneath said light admissive top section, which float is capable of changing its position inside said chamber so as to retain its position relative to the horizon when the chamber is filled; and a mirror on the top face of said float.

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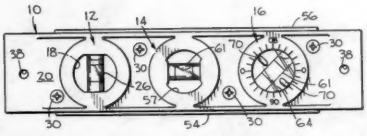
**4,590,682**

## COMPACT LEVEL

**Robert E. Koch, 2150 Monterey Rd. #126, San Jose, Calif. 95112**

**Filed Mar. 21, 1985, Ser. No. 714,549**
**Int. Cl.[4] G01C 9/28**
**U.S. Cl. 33—383** **3 Claims**




1. A level housing structure containing three bubble capsules, said structure comprised of two identical main housing halves and two identical cylindrical housing halves that rotatably fit in the main housing halves wherein;

a single piece main housing half is comprised of a side wall element, top and bottom wall elements, two end wall elements and two divider wall elements which divide the main housing half into three sections wherein;

within a section at one end of the main housing half is an opening in the side wall element with a ring shaped boss surrounding it, said ring boss having nitches in its wall element for holding a vertical bubble capsule;

within the midsection of the main housing half is an opening

in the side wall element with nitches in the divider wall element for holding a horizontal bubble capsule;

within the section at the other end of the main housing half is an opening in the side wall element with a ring shaped boss around it, said boss having a larger inside diameter than the diameter of said opening whereby a circular ring shaped ridge is formed around said opening for retaining a rotatable cylindrical housing; and

within said end sections are a plurality of pairs of self tapping screw guide and receiving bosses which are arranged in positions to align with each other when two main housing halves are placed back to back; and wherein

a single piece cylindrical housing half rotatably fits in the main housing half, said cylindrical housing half comprised of: a short cylinder with a closed end from which lever elements extend and which has nitches in its cylindrical walls for holding a bubble capsule.

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4,590,683

## METHOD OF AND APPARATUS FOR DRYING WOUND FIBER OR YARN

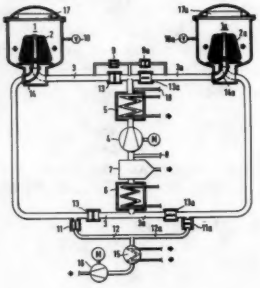
Berthold Magin, Hassloch, Fed. Rep. of Germany, assignor to MTM Obermaier GmbH & Co. KG, Hassloch, Fed. Rep. of Germany

Filed Oct. 5, 1984, Ser. No. 658,196

Claims priority, application European Pat. Off., Oct. 8, 1983, 83110084.7

Int. Cl.[4] F26B *5/04*

U.S. Cl. 34—1 9 Claims



1. Method of drying fiber or yarn wound on spools in a vessel comprising the steps of alternately heating, using an approximately moisture-saturated gas, and vacuum drying the fiber or yarn on the spools in the vessel whereby first the contents of the vessel are heated and subsequently, after terminating the heating step, the contents are then vacuum dried, wherein the improvement comprises the steps of during the heating step adjusting the moisture content of the heating gas in correspondence with the moisture content of the fiber or yarn being heated, and during the vacuum drying step, after drying the outer layer of the fiber or yarn on the spool, for a limited time intermittently introducing a flow of the moisture-saturated heating gas into the vessel while continuing the vacuum drying step for effecting an intermediate pressure in the vessel relative to the vacuum drying pressure whereby due to the introduction of the flow of the heating gas while continuing vacuum drying moisture located inwardly of the surface layer of the fiber or yarn on the spool is moved to the outer surface layer for facilitating the vacuum drying step until the drying step is completed.

4,590,684

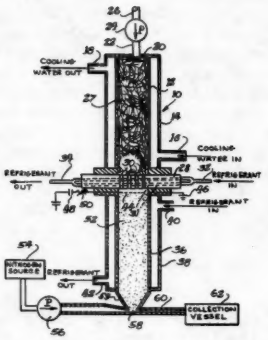
## CONTINUOUS FREEZE DRYING

Harold B. Arsem, Richmond, Calif., assignor to Eden Research Laboratories, Inc., Richmond, Calif.

Filed Nov. 20, 1984, Ser. No. 673,394

Int. Cl.[4] F26B *5/06, 13/30;* F25C *1/00*

U.S. Cl. 34—5 16 Claims



12. A continuous freeze drying process including the steps of providing a slurry of material to be freeze dried, continuously flowing said slurry along a continuous path, freezing said slurry at a predetermined area of said path to maintain a pressure drop across said area, heating said slurry immediately downstream of said predetermined area, and exposing said frozen and heated slurry to a reduced pressure to effect sublimination of the frozen material.

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4,590,685

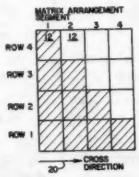
## METHOD & APPARATUS FOR UNIFORMLY DRYING PAPER WEBS AND THE LIKE

Reinhold C. Roth, 27 Chastellux Ave., Newport, R.I. 02840

Filed Nov. 9, 1984, Ser. No. 670,335

Int. Cl.[4] F26B *21/10*

U.S. Cl. 34—31 17 Claims




1. A method of drying a moving web to control the amount of moisture in the web by comprising the steps of:

arranging a plurality of dryer units in a regular matrix of rows and columns so that the dryer units in each row are arranged parallel to one another, each row being transverse to the direction of movement of the web and so that the dryer units in each column are parallel to the other columns and parallel to the direction of movement of the web, each column of dryer units being arranged to dry an associated longitudinal portion of the web;

adjusting the moisture content in each longitudinal portion of the web by adjusting the dryer units associated with the aforesaid longitudinal portion so that selected ones of the dryer units are operated at either a high flame condition or a low flame condition according to the amount of drying desired, said low flame condition being sufficient to sustain combustion of the fuel supplied to the dryer units

while providing an insignificant amount of drying and the high flame condition being sufficient to provide a significant measureable amount of drying;

operating at least one and less than all of the dryer units in said column according to a predetermined duty cycle of a preselected interval such that the amount of time that the last mentioned dryer unit is maintained at the high flame condition during said interval is a function of the desired amount of drying, the last mentioned dryer unit being maintained at the low flame condition during the remainder of the duty cycle interval.

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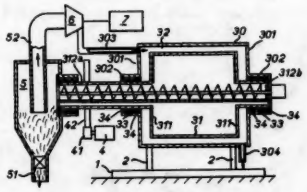
**4,590,686**

## DRYING PLANT FOR LIQUID OR PASTY PRODUCTS

**Jean-Claude Massot, Paris, France, assignor to Electricite de France Service National, Paris, France**

**Filed Apr. 10, 1984, Ser. No. 598,820**
**Claims priority, application France, Apr. 14, 1983, 83 06109**
**Int. Cl.[4] F26B *11/06***
**U.S. Cl. 34—86** **4 Claims**



1. A plant for drying liquid or paste products containing a solvent, said plant comprising a dryer including an outer jacket, an inner cylinder within said outer jacket and a space between said outer jacket and said inner cylinder, said space constituting a heating chamber, means for driving in rotation said inner cylinder about a longitudinal axis relative to said outer jacket, said dryer further comprising means for feeding products to be dried into said inner cylinder and for spreading such products over an inside wall of said inner cylinder so as to coat said inside wall, means for removing dried solid products from said inside wall, means for evacuating from said inner cylinder dried solid products and exhaust gas produced in drying the products, means for separating the exhaust gas and the dried solid products, an outlet for the exhaust gas and a circuit for recovering and compressing all of the exhaust gas for feeding it to said heating chamber.

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**4,590,687**

## HAIR STYLING DIFFUSER

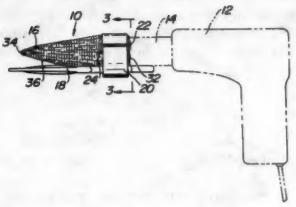
**Richard Caruso, 7801 Montgomery Ave., Elkins Park, Pa. 19117**

**Filed Apr. 5, 1985, Ser. No. 720,432**
**Int. Cl.[4] F26B *19/00***
**U.S. Cl. 34—97** **7 Claims**

1. A hair styling diffuser for attachment to a hair blower comprising:

a flexible pouch being free of integral supporting structure and having a single open end adapted for telescoping engagement with a hair blower nozzle, said pouch having a plurality of perforations therein;

means for combing; and



securing means adjacent said pouch open end and adapted for securing said means for combing to said pouch and said pouch to the nozzle of said hair blower.

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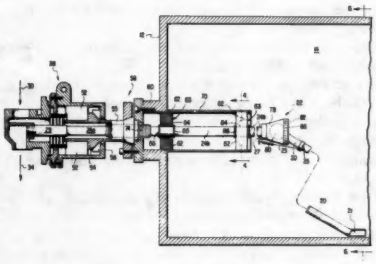
**4,590,688**

## STEAM DRYER DRUM

**Robert F. Steffero, Sr., P.O. Box 429, Seymour, Conn. 06483**

**Filed Oct. 6, 1983, Ser. No. 539,549**
**Int. Cl.[4] F26B *11/00***
**U.S. Cl. 34—124** **2 Claims**



1. A steam dryer drum construction including a steam supply housing, the interior of the housing adapted to receive steam from a steam generating device, a rotary steam drying drum, the drum adapted to be rotatably mounted for rotation about its longitudinal axis and whose exterior surface is adapted to contact a web of indefinite length of a material to be dried, such as a web of paper during its manufacture, a condensate tube having a horizontal portion and an angled portion, the horizontal portion having its exit end non-rotatably mounted in the steam supply housing and having its entrance end inside the steam drum, the open, input end of said angled tube portion being contiguous to the interior surface of the steam drum, a tubular journal carried by at least one end of said drying drum, and adapted to carry steam into the drum interior, at least one support spider in the tubular journal, the support spider having a plurality of radially spaced struts whose radially outermost portions slidably engage the inner walls of the hollow journal and whose central portion has an aperture through which rotatably passes the stream condensate tube, to thereby non-rotatably support the steam condensate tube, that portion of the condensate tube between its exit end and the support spider being substantially coincident with the longitudinal axis of the steam drum, whereby the steam condensate tube is supported by the spider support and does not rotate with rotation of the steam drum or the at least one support spider, the at least one support spider being positioned at the exit of the tubular journal, and wherein the regions between the radially extending arms of the at least one support spider form constructions for steam passing through the tubu-

lar journal into the steam drum interior, whereby the constrictions cause the steam to increase its velocity just prior to entry into the drum interior from the hollow journal, such increase in velocity resulting in a more rapid transfer of the latent heat energy in the steam to the drum upon entry and thermal expansion of the steam into the drum interior from the hollow journal than if the steam velocity were not increased just prior to entry of the steam from the hollow journal end into the drum interior.

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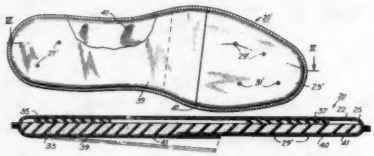
**4,590,689**

## AIR-TRAPPING INSOLES

**David Rosenberg, New York, N.Y., assignor to Vynalam, Ltd., New York, N.Y.**

**Filed Aug. 30, 1984, Ser. No. 645,681**
**Int. Cl.[4] A43B *7/06***
**U.S. Cl. 36—3 B** **16 Claims**



1. An insole for use inside footwear between the inner surface of the footwear sole and the bottom of a wearer's foot, comprising:

a first resilient sheet having a shape substantially identical to said inner surface of said sole;

a second resilient having a shape identical to said first resilient sheet and being attached together around the respective perimeters with an airtight seal to form a compartment therebetween;

a resilient foam member arranged within said compartment; and

at least one air vent formed in at least one of said first and second sheets for permitting air to enter and to exit said compartment, thereby drawing air into said compartment and expelling said air when said insole is used by a person in locomotion;

wherein at least one of said first and second resilient sheets further includes a slit for permitting the insertion or removal of said resilient foam member in said compartment, and said slit is comprised of adjacent, overlapping edges for forming an airtight seal upon mutual engagement under weight of the wearer.

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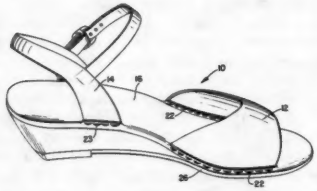
**4,590,690**

## ARTICLE OF FOOTWEAR AND METHOD OF MAKING SAME

**Wilhelm Pfander, Brewer, Me., assignor to Penobscot Shoe Company, Old Town, Me.**

**Filed Aug. 23, 1985, Ser. No. 768,702**
**Int. Cl.[4] A43B *13/28***
**U.S. Cl. 36—18** **7 Claims**



1. An article of footwear comprising a flexible elongated upper portion, a flexible socklining and an innersole; said upper portion having a plurality of apertures disposed near and substantially parallel to the ends thereof; said socklining having elongated slits therein near the sides thereof, said slits corresponding in number and generally in length to the ends of said upper portion; a plurality of apertures running along both sides of each of said slits; said upper portion being inserted into said slits to generally align said apertures in said upper portion with said apertures in said socklining; and means extending through said apertures to join said upper portion and said socklining at the points of insertion and form seams therebetween; said innersole having notches in the periphery thereof that correspond generally in length to that of said seams; the peripheral portion of said socklining being wrapped around and attached to said innersole with said seams being positioned in said notches; and a sole portion being joined to said innersole; said seams being located closely adjacent and substantially parallel to said sole portion.

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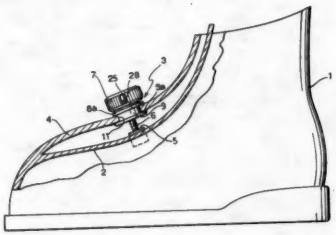
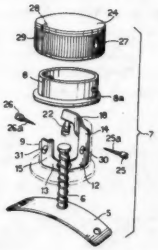
**4,590,691**

## DEVICE FOR PRESSING THE TONGUE OF A SKI BOOT ON TO THE INSTEP OF THE WEARER OF THE BOOT

**Olivieri Oliviero, Montebelluna, Italy, assignor to Icaro Olivieri & C. S.p.A., Montebelluna, Italy**

**Filed Jan. 22, 1985, Ser. No. 693,340**
**Claims priority, application Italy, Jan. 23, 1984, 19273 A/84**
**Int. Cl.[4] A43B *5/04, 23/26***
**U.S. Cl. 36—119** **10 Claims**





1. A device for pressing the tongue of a ski boot on to an instep of a wearer of the boot, said device comprising:

a plate attached to said tongue,

a threaded shank fixed to said plate,

an operating knob for said threaded shank, said operating knob being supported for rotation externally of said boot,

a splitnut incorporated in said knob and said splitnut being screwed onto said threaded shank to gradually move said plate away from said knob, and

means for opening said splitnut to rapidly disengage said splitnut from said threaded shank.

**4,590,692**

## REAR ENTRANCE SKI BOOT STRUCTURE WITH CONSTANT FLEX

**Alfio Leonardi, Rome, Italy, assignor to Nordica S.p.A., Montebelluna, Italy**

**Filed Jul. 16, 1984, Ser. No. 631,362**
**Claims priority, application Italy, Jul. 21, 1983, 22448/83[U]**
**Int. Cl.[4] A43B *5/04***
**U.S. Cl. 36—120** **6 Claims**

1. Rear entrance ski boot structure comprising a shell including a front upper region, a rear quarter hinged on said shell at a distance from said front upper region and a front quarter as a separate component part of the ski boot structure and having a forward portion thereof facing said front upper region of said shell, between said forward portion and said front upper region means defining a pivot axis for said rear quarter and extending transverse to the longitudinal extension of the ski boot, said means defining a pivot axis comprising hinge formations coaxial with said pivot axis and arranged on said forward portion and said front upper region to allow swinging of said front quarter about said pivot axis and spring means opposing forward swinging movement of said quarter about said pivot axis, thereby to provide a ski boot flex constant in time.

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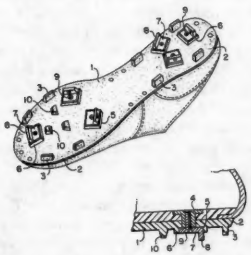
**4,590,693**

## BASEBALL OR SOFTBALL SHOE SOLE

**Yukio Kawashima, Akashi, and Kounosuke Nishijima, Osaka, both of Japan, assignors to Mizuno Corporation, Osaka, Japan**

**Filed Jun. 19, 1984, Ser. No. 622,165**
**Claims priority, application Japan, Jun. 21, 1983, 58-95378[U]**
**Int. Cl.[4] A43B *5/00;* A43C *15/16***
**U.S. Cl. 36—126** **1 Claim**



1. A baseball or softball shoe comprising:
- a synthetic resin sole including a plurality of projections formed integrally therewith and being located adjacent to a periphery of the synthetic resin sole in its forefoot and heel regions,
- square rims formed integrally with the sole in each of the forefoot and heel regions defining square recesses at the bottom of the synthetic resin sole,
- an internally threaded fitting embedded in the synthetic resin sole at the bottom of each of the square recesses,
- an individual L-shaped spike having a base received in each of the square recesses, said base being shaped complementary to said square recesses,
- a screw threadedly received in each internally threaded fitting through the base of the spike to secure the spike to the sole, and
- a plurality of second projections formed integrally with the sole and being located centrally in its forefoot region.

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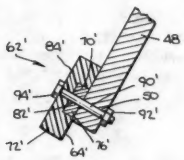
**4,590,694**

## SNOW PLOW WITH BAR REINFORCED DEFORMABLE BLADE

**Harvey P. Block, Westport, Conn., assignor to U.S. Highway Products, Inc., Orangeburg, N.Y.**

**Continuation-in-part of Ser. No. 669,581, Nov. 8, 1984. This application Feb. 6, 1985, Ser. No. 698,804**
**Int. Cl.[4] E01H *5/04***
**U.S. Cl. 37—233** **21 Claims**



1. A snow plow blade for mounting to a mold board of a snow plow comprising:
- a sheet of flexible lightweight material capable of returning substantially to its original shape after deformation, said sheet being resistant to corrosion from moisture and salt and to road abrasion;
- said sheet having a front surface and a back surface to be adjacent said mold board, each of said surfaces extending from the top of said sheet to define the thickness of the blade, said thickness being relatively constant;
- said bottom being defined by a relatively straight edge for better snow removal;
- a groove in said back surface displaced from a bottom edge of said sheet and extending from a first end of said sheet to a second end of said sheet, said groove defining a portion of decreased thickness in said sheet;
- a reinforcing bar in said groove, said bar having a top surface and a bottom surface and being constructed of a relatively strong and rigid material to reinforce said sheet in the direction of the plane of the back surface; and
- means for mounting said bar in said groove.

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**4,590,695**

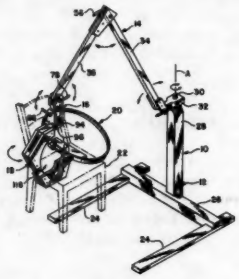
## ADJUSTABLE QUILTING FRAME

**Dean D. McGillivray, 6121 W. Clayton Rd., Piqua, Ohio 45356**

**Filed Jul. 19, 1985, Ser. No. 756,532**
**Int. Cl.[4] D06C *3/08;* D05C *1/04***
**U.S. Cl. 38—102.2** **7 Claims**

1. An adjustable quilting frame comprising:
- a base;
- an articulated arm pivotally attached to said base;
- a positionable joint attached to said arm and having a first member attached to said arm to pivot about a first axis, and a second member attached to said first member to pivot about a second axis;
- a cradle attached to said second member to pivot about a third axis, said cradle having a C-shape and being connected at an upper end thereof to said second member;
- hoop means for retaining a quilt, said hoop means having an inner hoop member attached to a lower end of said cradle

and an outer split hoop member carried on said inner hoop member, said hoop means being spaced separately from and below said upper end of said cradle such that an open crook portion of said cradle extends between said upper and lower ends thereof; and



means for releasably locking said first member to said arm means, said second member to said first member, and said cradle means to said second member, whereby said hoop means may be fixed at a predetermined orientation and elevation.

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**4,590,696**

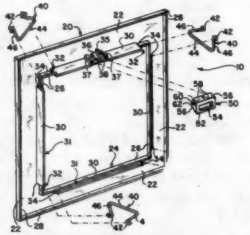
**DISPLAY FRAME ASSEMBLY**

**Frank Squitieri, 495-4th St., Brooklyn, N.Y. 11215**

**Filed Dec. 18, 1984, Ser. No. 683,232**

**Int. Cl.[4] A47G *1/06*; G09F *1/12***

**U.S. Cl. 40—156** **18 Claims**



**14.** Frame assembly for mounting, framing and hanging on a wall a framable object of visual interest, which comprises:

frame means comprising continuous walls and a centrally disposed display opening surrounded by and defined by said continuous walls;

frame-reinforcing rib means projecting rearwardly from, and substantially perpendicular to, the rear surface of said continuous walls of said frame means, said rib means being positioned and generally extending along a path intermediate between the inner and outer edges of said continuous walls of said frame means, so that a nest, formed by and comprising the inner walls of said frame-reinforcing rib means and the rear surface portion of said continuous walls of said frame means extending between said rib means and said centrally disposed display opening, is provided, said nest fittingly accommodating the framable object;

a plurality of resilient retaining clip means to be attached individually, adjustably, tensionedly and removably on said frame-reinforcing rib means, each of said retaining clip means having a portion extending from the attachment portion of said retaining clip means inwardly to overlay and hold a portion of the framable object firmly against said rear surface portion of said continuous walls of said frame means; and

mounting bracket means to be secured to the wall on which the framable object is to be hung, said frame means and said mounting bracket means having mutually mating complementary coupling means so that, when pressed together to engage said mutually mating coupling means, said mounting bracket means holds said frame means removably in secure supportive relationship on the wall.

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**4,590,697**

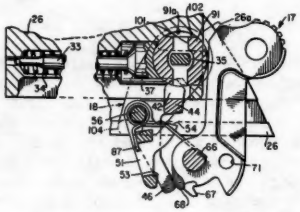
**AMBIDEXTROUS SAFETY MECHANISM**

**William B. Ruger, Croydon, N.H., and Roy L. Melcher, Stratford, Conn., assignors to Sturm, Ruger & Company, Inc., Southport, Conn.**

**Filed Jun. 25, 1984, Ser. No. 624,188**

**Int. Cl.[4] F41C *17/04, 17/00***

**U.S. Cl. 42—70 F** **3 Claims**



**1.** In a semi-automatic pistol having a reciprocating slide with a firing pin therein, a trigger, a trigger bar, a sear, and a hammer, the improvement comprising

(A) a pivotal firing pin blocking means mounted on the pistol frame, the blocking means having

(i) an upper finger means for blocking the firing pin;

(ii) a lower trigger-bar-engageable projection lug positioned in and at times engageable with the trigger bar;

(B) a trigger bar having a forward end portion and a rearward end portion;

(i) the forward end portion pivotal about the trigger;

(ii) the rearward end portion having

(a) a configured opening therein for receiving said blocking means projection lug;

(b) a hammer engageable extension; and

(c) an upper surface engageable with a surface on the slide;

(C) a sear mounted adjacent the blocking means and engageable with the hammer when the hammer is lowered; such sear caused to rotate by rotation of the blocking means;

(D) a configured surface on the slide in engagement with the upper surface of the trigger bar to permit the rearward end portion of trigger bar to (i) raise when the slide is forward and (ii) to lower when the slide is rearward;

a manual safety lever arrangement comprising

(a) slide bearing openings in such slide adjacent the firing pin;

(b) a safety lever body portion rotatably mounted in the slide bearing openings straddling the firing pin, said body portion including a right-hand body section projecting from the right-hand of the slide and a left-hand body portion projecting from the left-hand side of the slide; said body portion being rotatable to a first position and to a second position;

(c) first hammer means on one of the body sections for permitting the hammer to engage the firing pin in the first position;

(d) second hammer means on one of the body sections for preventing the hammer from engaging the firing pin when the lever is in the second position;

(e) firing pin blocking means on one of the sections for blocking the firing pin in the second position;
(f) sear engaging means on one of the body sections for rotating the sear so it cannot engage the hammer in such section safety lever position; and
(g) trigger bar engaging means for engaging the trigger bar to prevent the bar, in its forward movement, from rotating the firing pin blocking means to unblock the firing pin.

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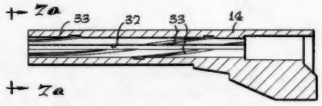
4,590,698

**BARREL BYPASS SYSTEM—FULL LENGTH GROOVE**

Charles A. Finn, 3204 Production Ave., Oceanside, Calif. 92054

Continuation-in-part of Ser. No. 442,612, Nov. 18, 1982. This application Mar. 15, 1983, Ser. No. 475,533
Int. Cl.[4] F41C *21/00*
U.S. Cl. 42—78 5 Claims




1. A rifled barrel for a firearm comprising:
an elongated tube with a front end, a rear end and a firing chamber adjacent the rear end of the tube;
a plurality of rifling grooves of a depth corresponding to the diameter of a bullet to be fired from said barrel extending from the front of said firing chamber to the front end of the tube; and
at least one gas pressure relief groove in said tube;
said groove extending from the front of said firing chamber to the front end of the tube;
said groove having a depth greater than the depth of said rifling grooves;
whereby some of the gas pressure generated in the firing chamber upon firing of a cartridge including a projectile therein will continuously bypass around the cartridge projectile as the projectile moves down the barrel and reduce the muzzle velocity of the projectile.

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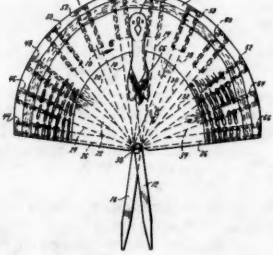
4,590,699

**FOLDABLE AND EXTENDABLE DECOY**

David Nicks, Rte. 1, Box 241, Gerald, Mo. 63037

Filed Jul. 29, 1985, Ser. No. 760,266
Int. Cl.[4] A01M *31/06*
U.S. Cl. 43—2 8 Claims



1. A readily-transported, readily-stored, light-weight decoy which comprises a plurality of elongated members that are held for selective movement into close proximity to each other during the transporting or storing of said decoy and for selective movement away from each other into spaced relation during use of said decoy, and a collapsible and extendible surface which is supported by said plurality of elongated members, said surface being in its collapsed condition whenever said elongated members are in close proximity to each other during the transporting or storing of said decoy but being in its extended condition whenever said elongated members are in said spaced relation during use of said decoy, said collapsible and extendible surface having a pictorial representation thereon which makes said decoy appear lifelike, said elongated members and said collapsible and extendable surface represent the tail portion of a creature, and wherein a three-dimensional representation of the neck and head of said creature is provided at the front face of said readily-extended and collapsed surface.

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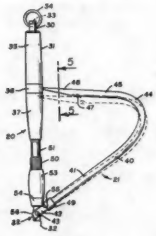
4,590,700

**SAFETY FISH LANDING HOOK**

Gerald B. Klein, 13451 Stuart Ct. (Rt. 2, Box 713), Broomfield, Colo. 80020

Filed Jul. 16, 1984, Ser. No. 631,442
Int. Cl.[4] A01K *97/14*
U.S. Cl. 43—5 10 Claims



1. A landing hook for landing fish comprising:
(a) an elongate member having a handle at one end and a comparatively large hook at the other end with the handle portion nearest adjacent to the hook and the hook shank adjacent to the handle being rod-like members of comparable size and form.
(b) a hinge formed as intermeshed fingers connecting the handle and hook having an axis normal to the plane of the hook to permit the hook to swing from an extended position, where the handle portion and hook shank form a continuous rod-like structure, to a retracted position where the point of the hook engages the side of the handle;
(c) a sleeve shiftable upon the handle to move over the hinge with the hook extended to lock the hook in the extended position;
(d) a spring means upon the handle urging the sleeve to the locking position;
(e) a socket in the side of the handle to receive the point of the hook but located a short distance from the position where the point of the hook engages the handle whereby the hook must be flexed and spread to move into the socket; and
(f) an engaging means in the socket and a holding means at the point of the hook adapted to secure the point of the hook in the socket responsive to the flexing pressure produced by spreading the hook.

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4,590,701

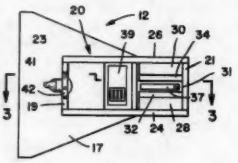
**FISHING POLE ALARM SYSTEM**

William B. Rivers, 2268 Park Boulevard, Oakland, Calif. 94606

Filed Aug. 27, 1984, Ser. No. 644,636
Int. Cl.[4] A01K *97/12*
U.S. Cl. 43—17 9 Claims

1. A fishing pole alarm system for warning of the presence of

a fish on a fishing line, including; vertical support means; a detector assembly adapted to support an upper end of the fishing rod disposed in inclined fashion with a lower end resting on the ground, said detector assembly including a channel formed in an upper side thereof and adapted to receive an upper portion of the fishing rod therein, said detector assembly




further including a generally rectangular housing having opposed end and side walls, and a notch formed in one of said end walls adapted to receive a portion of the fishing rod, switch means including an actuator extending into said channel to sense motion of the fishing pole indicative of a fish biting at the line, and alarm means connected to said switch means for alerting a fisherman when said switch means is actuated.

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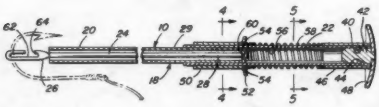
**4,590,702**

## FISHHOOK REMOVING TOOL

**John E. Chestnutt, 107 N. Laburnum Ave., Richmond, Va. 23223**

**Filed Dec. 18, 1984, Ser. No. 682,992**
**Int. Cl.[4] A01K** *97/00*
**U.S. Cl. 43—53.5** **6 Claims**




**1**. A fishhook removing tool including a first elongated tubular construction having first and second end portions, an elongated pull member telescoped into and longitudinally shiftable within said first end portion, said pull member including a first end projecting endwise outwardly of said first end portion and a second end longitudinally shiftable in said second end portion, said second end portion including longitudinal slot means formed therein, a finger-engageable member carried by said second end and projecting outwardly through and slidable in said slot means, said first end including a transverse opening formed therethrough and an entrance slot opening into said opening and outwardly of one side of said first end, spring means operatively connected between said pull member and tubular construction yieldingly biasing said pull member toward a position with said first end projecting outwardly of said first end portion, abutment surface means on said second end portion on the side of said finger-engageable member remote from said first end portion, said tubular construction being shiftable relative to said pull member, against the biasing action of said spring means, to a second postion with said transverse opening at least substantially fully recessed within said first end portion of said tubular construction, said tubular construction including a first sleeve member defining said first end portion and a U-shaped panel member, defining said second end portion, rolled into a configuration defining a pair of parallel strip members joined together at one pair of corresponding ends by a sleeve portion and being transversely arcuate, said sleeve portion being telescoped over the end of said first sleeve member remote from said first end of said pull member, said strip members defining said slot means therebetween, the other ends of said strip members including internal inwardly projecting ribs, a plug member including a circumferential groove embracingly received between said other ends of said strip members with said ribs seated in said grooves, said abutment surface means being carried by the other end of said plug member and projecting outwardly beyond said other end of said strip members, a sleeve telescoped over said other ends of said strip members and abutted against said abutment surface means, said spring means comprising a coiled spring telescoped over the ends of said strip members adjacent said sleeve portion and disposed beteen said sleeve and said sleeve portion.

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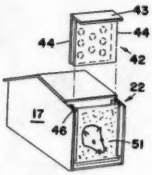
**4,590,703**

## ANIMAL TRAP

**Jack Cutter, 10 Sleepy Hollow La., Orinda, Calif. 94563**

**Filed Jun. 13, 1985, Ser. No. 744,221**
**Int. Cl.[4] A01M** *23/00*
**U.S. Cl. 43—61** **10 Claims**




**1**. An animal trap, including a housing defining a chamber, means defining at least one opening in said housing in communication with said chamber, barrier means positioned on said housing at said opening and movable between a first position in which said opening is open and a second position in which said opening is closed, and means for supporting an edible or chewable barrier member on said housing closing said opening and permitting a trapped animal to escape through said opening when said barrier means is in said first open position and when said barrier member is eaten or clawed through.

**10**. A method for trapping and releasing animals, including providing a housing defining an animal containing chamber wherein said housing has an entry door which is normally open but is movable to a closed position when the animal enters the chamber, and said housing further having an animal release door movable by the user between an open and closed position, and said housing also having an edible release barrier closing said chamber when said release door is open, said method comprising moving the trap to a desired release location when an animal is trapped in the chamber with the entry door and the release door both in a closed position, opening the release door so as to provide communication between the chamber and the edible release barrier, and then permitting the animal to escape from the chamber by eating through the edible release barrier.

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**4,590,704**

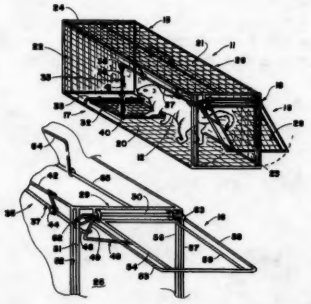
## TRAPPING APPARATUS

**Seymour A. Volk, Broadus, Mont., assignor to Charley Carl Emmons and Barry L. Emmons, both of Olive, Mont., part interest to each**

**Filed Nov. 28, 1983, Ser. No. 555,600**
**Int. Cl.[4] A01M** *23/02*
**U.S. Cl. 43—61** **13 Claims**

**1**. Trapping apparatus including a cage portion, a door portion, a door actuating portion and a door locking portion; said cage portion having a generally box shaped configuration, said cage portion including a bottom section, a top section, sidewall sections extending between said bottom and top sections, an end section extending between said sidewall sections and an opening at the opposite end of said cage portion; said door portion including an outwardly opening wall section, said wall section being pivotally and freely connected to said cage portion along a top edge of said cage opening; said door actuating

portion including a trigger section disposed within said cage portion, said trigger section being normally spaced above said bottom section, said trigger section being pivotally connected between said sidewall sections of said cage portion along a line remote from said door portion and substantially parallel to said bottom section, connecting means extending from said trigger section to a point adjacent said cage opening, said connecting means including a connector section extending upwardly from said trigger section, a rotatable rod member pivotally connected to an upper end of said connector section and extending along said top section to a point adjacent said cage opening, said rotatable rod member being supported inside said cage portion closely adjacent an upper corner edge thereof, a finger section extending substantially perpendicularly from the free end of said rod member adjacent said cage opening, a finger engaging section extending substantially perpendicularly from the top of a vertical edge of said door portion adjacent said finger section of said rod member, a diagonal support extending from a free end of said finger engaging section back to said vertical edge of said door portion, said finger engaging section and said diagonal support being disposed completely within



said cage portion when said door portion is closed; said door locking portion including at least a first bar member disposed adjacent a vertical edge of said cage opening, a second bar member affixed along an edge of said door portion adjacent and substantially parallel to said first bar member when said door portion is disposed over said cage opening, means independently disposed along each vertical edge of said door portion engaging each pair of said first and second bar members, said engaging means including a pair of substantially continuous ring members with one being slidable along each pair of said first and second bar members from a point adjacent said top section to a point adjacent said bottom section and back to said top section; whereby said door portion can be releasably set in an open position and closed and locked automatically by applying pressure to said trigger section to activate said door actuating portion so said finger section is moved from a horizontal to a vertical position enabling said finger engaging section and said door portion from which it extends to move past said finger section into a closed position and said door portion can be unlocked and opened automatically by inverting said apparatus.

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**4,590,705**

## LANDSCAPING DEVICE

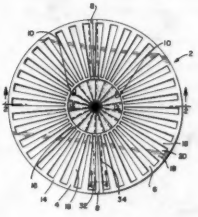
**Daniel O. Prince, P.O. Box 3149, Dallas, Tex. 75221**

**Filed Nov. 1, 1983, Ser. No. 547,565**
**Int. Cl.[4] A01G *13/02***
**U.S. Cl. 47—25** **4 Claims**

**1.** Apparatus for surrounding the base of a vertical plant object for protecting the object, preventing the growth of grass and weeds adjacent said object and presenting a flat surface for supporting the wheels of a mowing vehicle, yet assure water and air exposure to the soil surface surrounding the object comprising:

a plurality of interconnecting segments radiating from an arcuate band to define a centrally located aperture for surrounding said object when interconnected,

each of said segments comprising a plurality of closely-spaced, radially extending walls of a predetermined thickness, each of said walls having a substantially flat top surface which is coplanar with the top surfaces of the other said walls, and a bottom surface angularly oriented with respect to said top surface, whereby when said segment is adjacent said object said top surfaces will be substantially level to form a discontinuous but generally



planar surface for supporting a mowing vehicle and said bottom surfaces sloping downwardly toward said object, and wherein said walls are spaced circumferentially from each other to provide a plurality of cavities, each of said cavities, radiating outwardly of said centrally located aperture, and bottom means extending between respective adjacent bottom surfaces of said walls, said bottom means being perforated to allow water to drain out and to allow air to ventilate through said bottom surface, whereby said cavities are completely open at their upper portions and partially closed at their lower portions by said bottom means so as to substantially prevent the germination and growth of grass and weeds in the area covered by said bottom surface.

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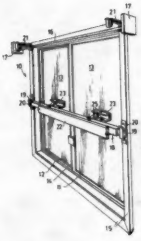
**4,590,706**

## PROTECTIVE DEVICE FOR PANES OF WINDOWS AND GLASS DOORS

**John S. Plowman, Nambour, Australia, assignor to Kinpar Pty. Ltd., Queensland, Australia**

**Filed Jul. 11, 1984, Ser. No. 629,577**
**Int. Cl.[4] E06B *3/68***
**U.S. Cl. 49—57** **4 Claims**



**1.** A protective device for panes of windows and glass doors including:

a beam,

mounting means for removably mounting the beam substantially parallel to and spaced from the inside face of the pane,

a pressure pad mounted on the beam for movement to an

operative position against, and applying pressure to, the inside face of the pane,

a pelmet fascia secured to the rear or inside face of the beam, and

means for releasably supporting the beam in a stored position above a window or door.

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**4,590,707**

## RELEASABLE PANEL ASSEMBLY FOR WINDOW FRAME OR THE LIKE

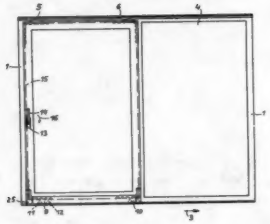
**Jüliüs M. von Resch, Stuttgart, Fed. Rep. of Germany, assignor to Gretsch-Unitas GmbH Baubeschläge, Ditzingen, Fed. Rep. of Germany**

**Filed Mar. 14, 1984, Ser. No. 589,585**

**Claims priority, application Fed. Rep. of Germany, Mar. 19, 1983, 8308201[U]**

**Int. Cl.⁴ E05D** *15/20*

**U.S. Cl. 49—130** **12 Claims**



1. A panel assembly particularly for a door or a window comprising:

a frame member;

a panel member composed of a plurality of constituent members at least two of which are arranged adjacent each other, said panel member being thus formed with a generally planar configuration having an upper edge and a lower edge;

means mounting said panel member on said frame member for movement between a closed position in which said panel member is located to be within a first generally vertical plane, a tilted position at which said panel member is pivoted about said lower edge with said upper edge being spaced away from said frame member, and a laterally offset position at which said panel member is located to lie within a second generally vertical plane parallel to and spaced from said first plane in a direction away from said frame member;

an angular housing connected to said panel member adjacent said lower edge between at least two of said adjacent constituent members thereof to provide a reinforcing connection tending to strengthen the rigidity of said panel member; and

at least one releasing arm connected between said frame member and said panel member, said releasing arm being arranged to extend between said panel member and said frame member to support said panel member at the lower end thereof when said panel member is in said laterally offset position.

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**4,590,708**

## ARRANGEMENT FOR TILTABLY MOUNTING A WINDOW SASH

**Salvatore I. Campodonico, Blauvelt, N.Y., assignor to Allen-Stevens Corp., Woodside, N.Y.**

**Filed Mar. 1, 1985, Ser. No. 707,242**

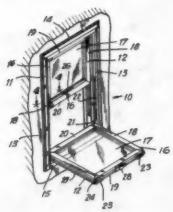
**Int. Cl.⁴ E05D** *15/22*

**U.S. Cl. 49—181** **9 Claims**

1. An arrangement for mounting a lateral region of a window sash in a track of a lateral portion of a sash window frame for sliding longitudinally of the track in a normal position of the window sash in which the latter extends along the plane of the sash window frame, and for tilting into a plurality of tilted positions in which the window sash includes different angles with the plane of the sash window frame, comprising

a mounting slide received in the track for sliding longitudinally thereof and including a main portion having two lateral portions each having a sliding surface facing oppositely with respect to the respectively other sliding surface and away from the latter and toward a respective side portion of the track for slidingly guiding said main portion in the track, and top and bottom portions, means for bounding a cylindrical through opening through said main portion, and two arms depending from said top portion in juxtaposition with said main portion to and beyond said opening, said arms having respective holding regions which bound a passage therebetween which is axially aligned with said opening and detaining portions which face the side portions of the track, said arms being resiliently yieldable substantially in opposite directions along the bottom portion of said main portion toward and away from the respective side portions of the track while being integral with said top portion of said mounting slide;

a bearing element having a substantially cylindrical shank portion and a disc-shaped end flange portion delimiting said shank portion, said shank portion having a mounting



region which, in an assembled condition of said bearing element with said mounting slide, is received in said opening of said main portion of the latter, and a spreading region situated intermediate said mounting region and said end flange portion and passing through said passage in said assembled condition, said spreading region having at least two diametrically opposite first surfaces spaced a smaller first distance from one another, and at least two diametrically opposite second surfaces spaced a greater second distance from one another and situated circumferentially between said first surfaces, said first and second surfaces facing said holding regions of said arms respectively in a first and a second position of said bearing element to determine the spacing of said arms from one another; and

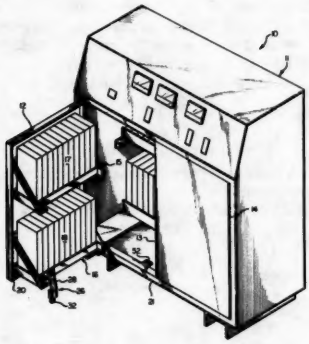
means for mounting said bearing element on the lateral region of the window sash for joint tilting movement therewith with the normal position corresponding to said first position with said detaining portions of said arms being spaced from the side portions of the track for permitting unimpeded movement of the mounting slide longitudinally of the track, and with the tilted position corresponding the said second postion with said second surfaces pressing said detaining portions against the side portions of the track for detaining said mounting slide in its then assumed position in the track so long as the sash window is in its tilted position.

4,590,709

## DOOR SUPPORT FOR A BATTERY STORAGE CABINET OR THE LIKE

Ilya Katsman, Bloomfield; John A. Ritchie, Lake Hopatcong; Mark Burmenko, Fairlawn, and Vladimir Zaltsman, Bloomfield, all of N.J., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Sep. 24, 1984, Ser. No. 653,330
Int. Cl.[4] E05F 7/06
U.S. Cl. 49—396 12 Claims



1. A support for a vertically hinged door comprising:
bracket means for attachment proximate a lower most free corner of the door;
support means attached to said bracket means and depending from said bracket means to engage a support surface, said support means being an elongated leg having one end pivotably attached to said bracket means for movement between a retracted stored position and an extended support position and having a free end with a castor wheel rotatably journaled to said free end;
stop means operatively associated with said leg for positioning said leg in the support position; and first spring means operatively associated with said leg for biasing said leg toward the support position.

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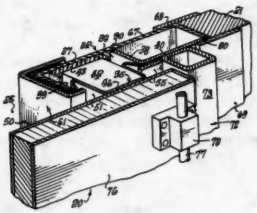
4,590,710

## SEAL FOR A SHIELDING ENCLOSURE WITH OPENING

James F. Newland, 18800 Mountain Dale Ct., Newhall, Calif. 91321

Filed Oct. 16, 1984, Ser. No. 661,432
Int. Cl.[4] E06B 7/16
U.S. Cl. 49—478 11 Claims



1. A seal assembly to prevent radio-frequency signals from leaking to or from a shielded enclosure system including a door frame to which the seal assembly adapts, a door swingable into a closed mode with the door frame, said door frame including a pocket for disposition for said seal assembly, said seal assembly comprising
a magnetic member mountable in the pocket,
a non-magnetic electrical conducting membrane formed in segments comprising
(1) a first segment mounted contiguously to a face of said magnetic member,
(2) spaced second segments integrally formed to said first segment and constituting resilient formations in said membrane,
(3) a third segment integrally formed to one of said second segments,
(4) a fourth segment integrally formed to the other of said second segments and being wrapped around the door frame forming the pocket,
means for securing said third segment to the door frame to one side of the pocket,
means for securing the wrapped around portion of said fourth segment to the door frame forming the bottom of the pocket, and
means for resiliently disposing said membrane and magnetic member beyond the pocket against the action of said resilient formations.

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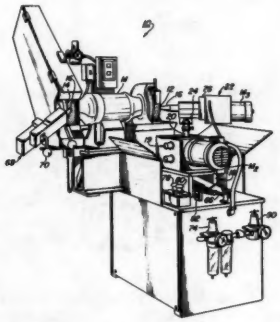
4,590,711

## SEMI-AUTOMATIC GRINDING MACHINE

Phillip A. Sollami, 1300 E. Pine, Herrin, Ill. 62948

Filed Mar. 13, 1984, Ser. No. 588,760
Int. Cl.[4] B24B 3/33
U.S. Cl. 51—3 7 Claims



1. A machine for grinding a workpiece comprising:
a rotatably driven grinding wheel having a grinding surface;
a workpiece holder having controllable rotation and workpiece engagement and release for holding and rotating said workpiece relative to said grinding wheel surface;
means for controllably moving said holder toward and away from said grinding wheel to bring said workpiece into contact with said grinding wheel surface and to retract said tool therefrom;
means for controllably reciprocating said workpiece holder parallel to said grinding wheel surface for moving said workpiece back and forth across said surface of said grinding wheel when said workpiece is brought into contact therewith by said means for moving said holder;
means for reducing the speed of movement of said first holder toward said grinding wheel at a predetermined time after the start of said movement so that said workpiece is brought into contact with said grinding wheel surface at said reduced speed;
means for adjusting the speed of movement of said first holder toward said grinding wheel during the period of said movement ending at said predetermined time providing for repetitive positioning of said workpiece the same distance from said grinding wheel surface at said predeter-

mined time as said grinding wheel radial dimension changes; and

control means for causing said holder to engage and rotate said workpiece, for causing said means for moving to start movement of said holder toward said grinding wheel, and for causing said means for reciprocating to reciprocate said holder, and for causing, at said predetermined time, said means for reducing to reduce the speed of motion of said holder, and advance said rotating and reciprocating workpiece against said wheel surface at said reduced speed to grind the workpiece, then for causing said means for moving to retract said holder away from said grinding wheel, for causing said means for reciprocating to stop reciprocation of said holder, and for causing said holder to stop rotation and release said workpiece.

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**4,590,712**

**VERTICAL SPINDLE DUPLEX HEAD FOR A GRINDER**

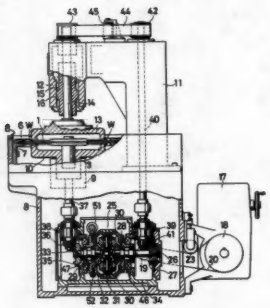
**Yasuo Sugiyama; Masaomi So, both of Osaka; Ichiro Hamaguchi, Nara, and Kenichi Maeda, Osaka, all of Japan, assignors to Koyo Seike Company Limited and Koyo Machine Industries Company, both of Osaka, Japan**

**Continuation of Ser. No. 574,961, Jan. 30, 1984, abandoned. This application Oct. 4, 1985, Ser. No. 785,082**

**Claims priority, application Japan, Jun. 8, 1983, 58-102249**

**Int. Cl.[4] B24B *5/00***

**U.S. Cl. 51—161** **1 Claim**



1. A vertical spindle duplex head for a grinder for grinding the end face of a workpiece to be rolld while rotating and revolving the workpiece, comprising a receiver wheel of an annular shape, a pressure wheel disposed above the receiver wheel, a pressing means for advancing and retreating the pressure wheel toward and from the receiver wheel, a rotary carrier for holding in a peripheral groove the workpiece to be put between the receiver wheel and the pressure wheel, an annular grindstone firmly held by a holding means concentrically with the rotary carrier, and a driving means for driving the receiver wheel and the pressure wheel to be rotated in opposite directions, characterized by:

a distributive transmittance mechanism comprising a first driving shaft, a bearing housing of the frame supporting the first driving shaft, a first bevel gear fixed to a lower end of the driving shaft, a second shaft driven by a reduction gear through pulleys and a timing belt, a frame supporting said second shaft, a gear box formed integrally with the frame supporting the second shaft, a second bevel gear mounted on the second shaft, a third bevel gear engaging the first bevel gear and the second bevel gear at the same time, and a cover of the gear box rotatably supporting the third bevel gear;

a differential gear mechanism comprising an input shaft with the third bevel gear mounted at an end thereof, a receiver wheel driving shaft supported by a bearing housing of the frame, a first gear of the receiver wheel driving shaft mounted at the lower end thereof, a second gear of an output shaft engaging the last mentioned first gear, said output shaft having the last mentioned second gear mounted at an end thereof, sun gears mounted opposite each other at the ends of the input shaft and the output shaft respectively, a pair of planet gears opposite each other engaging the sun gears, a planet gear shaft rotatably supporting the planet gears, a revolving gear case rotatably supporting the planet gear shaft and rotatably supported by the input shaft and the output shaft, and said gear box forming a bearing housing for the revolving gear case; and

a variable-speed driving means comprising a worm gear mounted on the revolving gear case concentrically with the output shaft, a second worm gear engaging the first mentioned worm gear and supported by the frame, and a variable-speed motor for driving the second worm gear.

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**4,590,713**

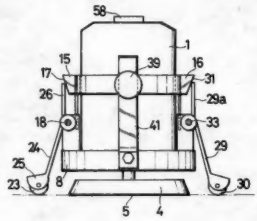
**POLISHING APPARATUS**

**Nobuhiko Yasui, 2928, Oaza Tatsuno, Sangocho, Ikoma-gun, Nara-ken, Japan**

**Filed Jul. 10, 1984, Ser. No. 629,500**

**Int. Cl.[4] B24B *23/03***

**U.S. Cl. 51—170 T** **5 Claims**



1. A polishing apparatus comprising:

a body having a base member;

a polishing member mounted on said body for rotation about a first axis, said polishing member having a polishing face extending perpendicular to said first axis;

means in said body for rotating said polishing member about said first axis;

an adjusting member having opposite ends;

means for mounting said opposite ends of said adjusting member on opposite sides of said base member for pivotal movement about a second axis orthogonal to said first axis;

a pair of abutment surfaces extending from opposite sides of said adjusting member;

a pair of guide members;

means for mounting said guide members on opposite sides of said base member for pivotal movement about respective third axes extending orthogonal to said first and second axes; and

said guide member mounting means including means cooperating with respective said abutment surfaces for varying the positions of said guide members with respect to said polishing member in response to pivotal movement of said adjusting member with respect to said base member about said second axis.

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**4,590,714**

**HEAT INSULATING TARPAULIN**

**Stanley F. Walker, Ontario, Canada, assignor to Manville Service Corporation, Denver, Colo.**

**Filed Nov. 2, 1984, Ser. No. 667,785**

**Int. Cl.[4] B62D *63/04;* E04B *1/34;* E04D *1/34***

**U.S. Cl. 52—3** **12 Claims**

1. A thermally insulating tarpaulin for protecting materials,

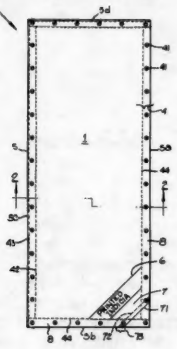
constructions or the like from effects of the weather comprising:

(a) a first membrane for facing outwardly from the material, construction or the like to be protected

(b) a second membrane for facing inwardly towards the material, construction and the like to be protected

(c) a resilient insulating batt sandwiched between said first membrane and said second membrane,

(d) a seam structure along each edge of said tarpaulin for fastening said first membrane, said second membrane, and said insulating batt together and for attaching said tarpaulin to at least another tarpaulin of similar construction,



(e) a vent through said first membrane for permitting the escape of air from between said first membrane and said second membrane when said insulating batt is compressed for storage of said tarpaulin,

(f) said vent comprising an opening, an overlap including a first free edge of said first membrane, a second free edge of said first membrane, said overlap overlying said second free edge, and said first free edge positioned below said second free edge when said tarpaulin is in the preferred orientation when in use.

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**4,590,715**

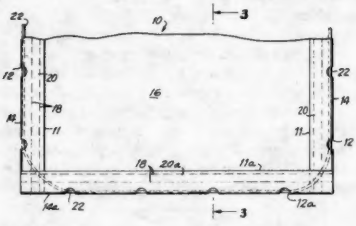
**TARPAULIN EDGE-FINISHED FOR SINGLE LINE TIE-DOWN**

**Nestor W. Pandell, Schenectady, N.Y., assignor to Weathermate Marine Manufacturing, Inc., Salem, Mass.**

**Filed Oct. 26, 1984, Ser. No. 664,910**

**Int. Cl.[4] B32B *3/04, 3/06***

**U.S. Cl. 52—3** **3 Claims**



1. A tarpaulin or other similar protective cover of flexible sheet material, wherein the periphery of the tarpaulin is uniformly edge-finished with a continuous hollow conduit, said edge-finished periphery being laterally fluted at equally spaced intervals with identical semi-circular cut-outs deep into said hollow conduit, each cut-out defining in the conduit wall a hole whose diameter is substantially exceeded by each of said equally spaced intervals; and wherein means for anchoring said tarpaulin to external tie-down devices are provided at the periphery of said tarpaulin, said means comprising a tie-down line loosely contained, and freely movable, within said continuous hollow circuit, said tie-down line having a length sufficiently exceeding that of said conduit to permit concomitant withdrawal from said conduit through said holes of respective length portions of said tie-down line in looped configurations for anchoring attachment to respective ones of said external tie-down devices.

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**4,590,716**

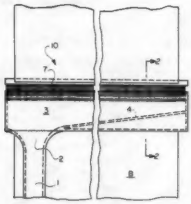
**GUTTER SYSTEM**

**Clark Smith, 1004 Wedgewood La., Durham, N.C. 27713**

**Filed Oct. 28, 1983, Ser. No. 546,747**

**Int. Cl.[4] E04D *13/06***

**U.S. Cl. 52—12** **19 Claims**



1. A gutter system comprising in combination a downspout communicating with a substantially closed conduit disposed below the eaves of a sloped roof, the conduit having an upper portion provided with a longitudinal slit formed therein along the length of the conduit, the slit having respective edges, a comb member having a planar first portion secured to the roof and substantially following the slope of the roof, the comb member further having a second portion carried by the first portion and bent downwardly therefom, the second portion of the comb member being arranged in a substantially vertical plane and having a plurality of comb teeth formed therein, the teeth extending through the longitudinal slit and into the conduit, and the teeth being in substantial frictional engagement with the edges of the slit, whereby the debris will wash off the roof and the water will be carried by capillary action by the comb teeth into the conduit, and whereby debris will be precluded from entering into the conduit.

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**4,590,717**

**STATIC THREE HINGED ARCH BUILDING STRUCTURE**

**Antonio R. Ruiz, c/o 919 W. Berkeley, Santa Ana, Calif. 92707, and William M. Simpson, 2340 Bayside Dr., Corona Del Mar, Calif. 92625**

**Filed Apr. 28, 1983, Ser. No. 489,371**

**Int. Cl.[4] E04B *1/344***

**U.S. Cl. 52—64** **16 Claims**

1. A structural building module which comprises:

(a) a first integrally cast upright structural member having a first single substantially vertical exterior wall portion and a first roof portion angularly disposed with respect to said first wall portion at an internal angle of greater than 90 degrees, said first wall portion having a support edge along the bottom portion thereof, said first roof portion having a joining edge therealong;

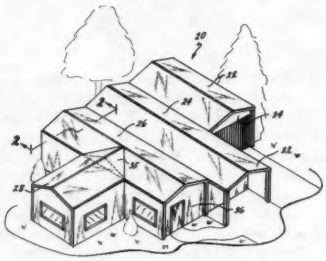
(b) a second integrally cast upright structural member having a second single substantially vertical exterior wall portion and a second roof portion, said second wall portion having a support edge along the bottom portion

thereof, said second roof portion having a joining edge therealong;

(c) a first structural member support means and a second structural member support means, said first and said second support means locatable in the supporting medium on which said structural building module will rest, each of said first and second support means having a portion thereof located near the surface level of said medium, each of said support means for supporting one of said structural members in an upright position on said portion of said support means located near surface level by contact of said structural member support edges on said portion of said support means located near surface level;

means for effectuating an interdependent compression of said first and second roof portions of said joining edges on said first and second roof portions when said joining edges are alignably disposed in face-to-face edgewise relationship to each other and by preventing lateral movement of the support edges of the first and second wall portions of said first and second structural members;

said first and second support means spaced apart from each other in said support medium a distance essentially corresponding to the finished width of said structural building module whereby when said first and second



upright structural members are located upright on and supported by said first and second support means said first and said second roof portions extend towards each other from said respective first and second wall portions to located said joining edges adjacent to each other in a position joinable by said joining means and together said first and second roof portions form the roof of said structural module;

an in situ formed structural base means, said structural base means formed by casting in situ after said first and said second upright structural members are located on and supported by said first and second support means, as formed said structural base means operatively connecting to said support edges on both said first and said second upright structural members and extending essentially horizontally between said support edges of said first and said second upright structural members;

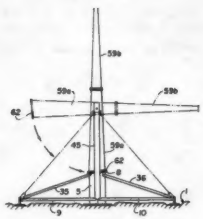
said structural base means operatively connecting to said support edges and said joining means joining said joining edges serving to hold said first and said second structural members connected to one another in an upright position with said first and said second wall portions being essentially vertical and said first and said second roof portions forming said roof between said respective wall portions.

**4,590,718**

## PORTABLE, ADJUSTABLE STRUCTURE AND METHOD OF ERECTING SAME

**Lloyd G. Angeloff, North Merrick, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Feb. 13, 1984, Ser. No. 579,274**
**Int. Cl.[4] B66C 23/06**
**U.S. Cl. 52—116** **16 Claims**



3. A portable, adjustable structure for supporting equipment at a distance above a support surface, said structure having a plurality of structural members and comprising

initial ones of said structural members placed on said support surface said initial ones of said structural members including a lower tower structural member placed on said support surface, said lower tower structural member having a centerline substantially perpendicular to said support surface, an upper part and a flange at its upper part end, said flange being inclined to a plane perpendicular to said centerline;

manual winching means for affixing additional ones of said structural members to said initial ones of said structural members, said ones of said structural members including structural members which are upright relative to said support surface, said additional ones of said structural members including a pair of spaced substantially parallel pivot support structural members affixed to opposite sides of said lower tower structural member and extending substantially perpendicularly to said support surface;

stabilizing means for stabilizing the structure on said support surface;

an equipment support structural member pivotally mounted on said additional ones of said structural members, said equipment support structural member having spaced opposite first and second ends, said equipment being affixed to said equipment support structural member at the first end thereof, said equipment support structural member being pivotally movable to a position substantially perpendicular to said support surface with said first end thereof spaced farther from said support surface than said second end thereof;

ballast means affixed to said equipment support structural member at said second end thereof; and

affixing means for affixing said second end of said equipment support structural member to said flange of said lower tower structural member of said initial ones of said structural members whereby said equipment support structural member is normally upright and is pivotable, upon unfastening of said affixing means, to position said equipment close to said support surface for maintenance and repair.

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**4,590,719**

## ERECTION HINGE

**John R. McKibbin, Birmingham, Ala., assignor to Mason Corporation, Birmingham, Ala.**

**Filed Feb. 11, 1985, Ser. No. 700,603**
**Int. Cl.[4] B66C 23/06**
**U.S. Cl. 52—116** **14 Claims**

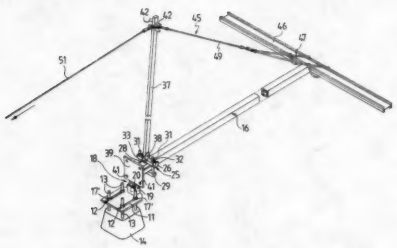
1. An apparatus for erecting a support column for engage-

ment with anchor bolts extending from a foundation, comprising:

(a) engaging means for releasably engaging said anchor bolts proximal said foundation comprising:

(i) a plate-like member having a plurality of outwardly opening slots therein for slidably engaging said anchor bolts; and

(ii) expendable fasteners threadably engaging each of said anchor bolts and releasably urged against the upper and lower surface of said plate-like member;



(b) an articulated joint having a fixed member rigidly connected to said engaging means and a movable member vertically offset from said engaging means and pivotally connected to said fixed member along a horizontal axis;

(c) cradle means affixed to said movable member;

(d) attachment means carried by said cradle means for releasably capturing one end of said column within said cradle; and

(e) force transfer means for applying force from an external source to the end of said column distal said cradle means for concomitantly pivoting said cradle and column about said horizontal axis.

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**4,590,720**

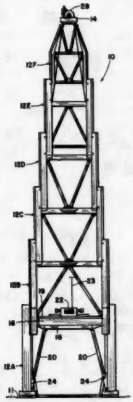
**TELESCOPING DERRICK**

**Lowell M. Reed, Moore, Okla., assignor to Parco Mast and Substructure, Inc., Tulsa, Okla.**

**Filed Feb. 6, 1984, Ser. No. 577,534**

**Int. Cl.[4] B66C *23/06***

**U.S. Cl. 52—121** **9 Claims**



1. A vertical axis, telescoping derrick or mast of rectangular cross-section, for drilling deep boreholes in the earth, comprising:

a first or outer base unit comprising a rectangular four-walled enclosure, having selected horizontal dimensions and having a support column in each corner;

a second liftable derrick element comprising a four-walled parallelepiped having a support column in each corner, and open at the top, the bottom having a floor therein, the second element being of rectangular horizontal cross-section similar to that of said base unit, and of such dimension as to be vertically coaxially slidable inside of said base unit, and having stop means to limit the upward travel of said second element;

at least a third innermost liftable derrick element comprising a four-walled parallelepiped open at top and bottom, of rectangular horizontal cross-section similar to that of said second element, and of such dimensions as to be vertically, coaxially slidable inside of said second element, and having means to limit the upward travel of said second element;

drum and cable means to lift said third element with respect to said second element, and to lift said second element with respect to said base unit, in which said cable means is operated in the corner columns of each of the adjacent derrick elements, and each corner column having at the top and bottom thereof at least one pulley and in which the floor of the second element supports a rotary table and drawworks and including at the top of the columns in said base unit and the bottom of the columns in said second derrick element at least a second lifting pulley whereby there will be at least three loops of cables supporting each corner of said second derrick element;

a vertical plate attached adjacent the bottom of each corner column of each derrick element projecting outside the outer contour of said column and having an upwardly directed slot;

a corresponding removable horizontal pin positioned inside the contour of and adjacent the top of the base unit and each derrick element except the innermost corner column of the uppermost element and adapted to fit into said slot of said plate of the next adjacent inner derrick unit as it is raised in place with respect to the next adjacent outer derrick unit to thereby lock each raised element to the next lower element.

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**4,590,721**

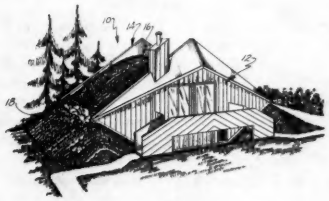
**WOOD PANEL EARTH SHELTER CONSTRUCTION**

**Jeremy R. Berg, 11015 Johnson; John G. Loveless, 1644 Waverly, and Walter Senkow, 15044 - 155th, all of Grand Haven, Mich. 49417**

**Filed Dec. 16, 1982, Ser. No. 450,465**

**Int. Cl.[4] E02D *1/92***

**U.S. Cl. 52—169.1** **8 Claims**



1. An earth sheltered building including an arch structure, said structure including footings, a floor extending between said footings and arch means extending between said footings and having a base having lower ends on said footings for defining an enclosure which is covered with earth and open at opposite ends, wherein said arch structure comprises:

a plurality of joined, curved wooden panel sections arranged in tandem in a plurality of adjacent rows with more than

two panel sections in a row, each of said sections including circumferentially extending wooden side members, transversely extending structural wooden end members joined to said side members, ribs extending between said side members and said end members to divide said sections into a plurality of compartments, a bottom structural wooden skin joined to said members, a top structural wooden skin joined to said members to enclose the compartments and insulation disposed within said compartments, said top and bottom skins being oriented strand board, said sections further including joint means along the side members of adjacent panels sections for joining said rows to each other, said joint means comprising at least one of said top and bottom skins of said panel sections being offset towards one of said side members to define a female side and a male side, said female side receiving a male side of an adjacent panel section in an adjacent row;

wooden sheathing sections overlying said top skins of said panel sections, said sheathing including a plurality of plywood sheets lapped over the joints between said panel sections and treated with a preservative;

an adhesive joining said panel sections together within each row and to adjacent rows;

waterproofing means on said sheathing for waterproofing the exterior surface of said arch means;

connecting means engaging the base of the arch means at said footings and within said floor for tying said base together at its lower ends; and

end walls and fastener means for joining the end walls to lateral edges of said arch means, said end walls dimensioned to extend above said arch means to retain earth placed on said arch means.

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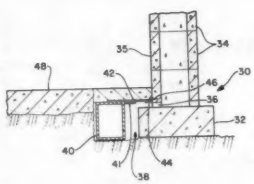
**4,590,722**

## UNIQUE IMPROVED DRAINAGE SYSTEM FOR BASEMENTS

**Joseph Bevelacqua, Akron, Ohio**

**Filed Oct. 29, 1984, Ser. No. 665,947**
**Int. Cl.[4] E02D *19/00***
**U.S. Cl. 52—169.5** **6 Claims**




1. A foundation wall and drainage tile system comprising

a footer,

a wall formed of hollow building blocks having openings in their upper and lower surfaces arranged vertically on said footer, the lowermost row of said building blocks having spaced portions in the inner wall surfaces thereof communicating with the interiors of said hollow building blocks and forming drainage openings adjacent an open area,

a basement floor extending to said blocks and connecting thereto above said drainage openings, and wherein the improvement comprises

an inner wall of said footer having said open area extending therealong,

a drain means comprising a hollow member having a plurality of drain openings formed in a lower portion thereof positioned in said open area, and

a substantially horizontal plate means bridging over said open area and supported on said drain means and a part of said blocks above said drainage openings,

said drain means constructed so as to have a supporting shelf for said plate means and said open area being free of gravel and other filler means.

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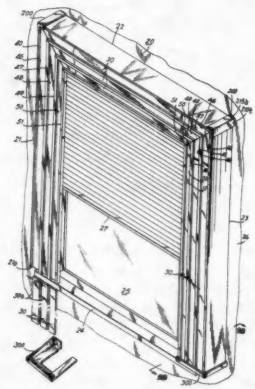
**4,590,723**

## LAMBREQUIN ASSEMBLY

**Lewis Nassau, 217 Forest Dr., Hillsdale, N.J. 07642, and Mordache Sabbah, 78-55 Boulevard East, North Bergen, N.J. 07047**

**Continuation-in-part of Ser. No. 589,660, Mar. 14, 1984. This application Apr. 25, 1985, Ser. No. 727,005**
**Int. Cl.[4] E06B *1/04***
**U.S. Cl. 52—211** **19 Claims**



1. In a lambrequin assembly having a plurality of sections in which one side of each section includes a strip receiving member for partially concealing the perimeter of a passageway to which the assembly is attached, said strip receiving member having at least inner channel means and outerchannel means for receiving and displaying at least one strip of decorative material, and in which each section further includes panel means for partially concealing the perimeter of the passageway to which the assembly is attached, bracket means for joining two of said plurality of sections together and having front and rear ends comprise:

front end channel means located at the front end of the bracket means and operable for overlapping and slidably receiving each of the outer channel means of the two adjoining sections so as to secure the front end of the bracket means to the two adjoining sections at and near the junction formed by the two sections; and

rear end channel means located at the rear end of the bracket means and operable for slidably receiving and engaging each of the panel means of the two adjoining sections so as to secure the rear end of the bracket means to the two adjoining sections at and near the junction formed by the two sections.

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**4,590,724**

## ANCHORAGE FOR STEEL WIRE STRAND FOR PRESTRESSED CONCRETE

**Makoto Kurauchi, Nishinomiya; Takeshi Kobayashi, Kobe; Masakazu Izumi, Ikoma, and Jiro Aota, Akashi, all of Japan, assignors to Shinko Kosen Kogyo Kabushiki Kaisha, Amagasaki, Japan**

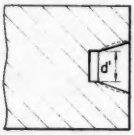
**Filed Apr. 28, 1983, Ser. No. 489,345**
**Int. Cl.[4] E04C *3/10***
**U.S. Cl. 52—223 L** **4 Claims**

1. An anchorage for PC wire strands, comprising:

an enlarged head portion formed by heading a terminal end of a PC wire strand; and

a single anchoring member held in pressure contact with a portion of said PC wire strand in a position near said

terminal end and having a side end held in close contact with said enlarged head portion, said anchoring member being from 1.5 to 2.0 times a diameter of said PC wire strand and a combined length of said enlarged head portion and said anchoring member being from 2.0 to 2.5




times said diameter of said PC wire strand wherein said anchoring member further comprises a compression grip having a sleeve and a friction enchancing member separate from said sleeve and positioned between said sleeve and said PC wire strand.

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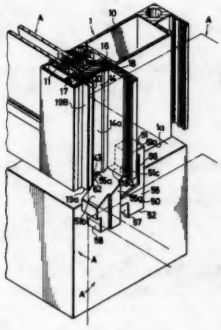
4,590,725

## SYSTEM FOR SEALING CROSS JOINT OF FOUR ADJACENT CURTAIN WALL UNITS

Hiromitsu Kaminaga, Kurobe, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Apr. 23, 1984, Ser. No. 603,281
Claims priority, application Japan, Apr. 26, 1983, 58-61462[U]; Apr. 26, 1983, 58-61463[U]
Int. Cl.[4] E04B *2/88, 1/66*
U.S. Cl. 52—235 1 Claim



1. A system for sealing a cross joint of a curtain wall construction including a plurality of curtain wall units arranged in a checkerboard pattern, comprising;

(a) a packing block adapted to be disposed at the cross joint between four adjacent curtain wall units;

(b) a pair of spaced first interior and exterior vertical gaskets adapted to be mounted between a pair of horizontally aligned first and second ones of the four adjacent curtain wall units to define therebetween a first vertical space, said first interior vertical gasket having a lower end disposed against a top of said packing block, said first exterior vertical gasket having a lower end spaced apart from said top of said packing block to define therebetween a drainage passage through which said first vertical space opens to the exterior;

(c) a pair of spaced second interior and exterior vertical gaskets adapted to be mounted between a pair of horizontally aligned third and fourth ones of the four adjacent curtain wall units to define therebetween a second vertical space, each of said second interior and exterior vertical gaskets having an upper end disposed against a bottom of said packing block; and

(d) said packing block having in each of its opposite sides a generally crank-shaped channel opening into said second vertical space.

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4,590,726

## DECORATIVE FACING

Edward J. Salazar, 400 Diamond, Fort Collins, Colo. 80525

Filed Jun. 10, 1983, Ser. No. 503,024
Int. Cl.[4] E04C *1/00, 2/24;* C04B *7/02*
U.S. Cl. 52—314 20 Claims

1. A decorative brick element having a thickness in the range of about 0.15 to 2 inches, said brick element comprising a slow-cured molded mixture of Portland cement, sand, and pigmented binder, wherein said brick element has a compressive strength characteristic of at least 1500 p.s.i. and high temperature color fastness.

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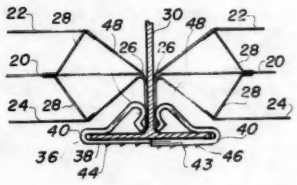
4,590,727

## REFLECTIVE INSULATION BLANKET WITH RETAINING CLIPS

A. Moayed Ghahremani, Gardena, and E. Freel Singleton, Grand Terrace, both of Calif., assignors to Foilpleat Insulation Company, Inc., Gardena, Calif.

PCT No. PCT/US82/01087, § 371 Date Mar. 15, 1984, § 102(e) Date Mar. 15, 1984, PCT Pub. No. WO84/00783, PCT Pub. Date Mar. 1, 1984
PCT Filed Aug. 9, 1982, Ser. No. 592,017
Int. Cl.[4] E04B *2/00*
U.S. Cl. 52—406 4 Claims




1. A reflective thermal insulating blanket with retaining clips mountable to flanges of building structural members, said thermal insulation blanket with retaining clips comprising the combination of:

a principal reflective foil having at least one outwardly reflective surface;

an outer reflective foil in parallel spaced relationship to said principal reflective foil to thereby create an air space therebetween;

expander means positioned between said principal reflective foil and said outer foil for securing them in their spaced relationship;

a mounting flange secured between said principal foil and said outer foil at the ends thereof for attachment to thereby provide a semi-rigid structural composite, said expander means being in close proximity to said mounting flange to thereby define a secondary air pocket between said principal reflective foil and said outer foil, whereby

said principal reflective foil and said outer reflective foil provide thermal insulation to the building;

retaining clips means adapted to compressibly engage said mounting flange to at least one structural member of a building, said retaining clip means including a pair of elongated bases with the first of said pair having parallel side means and the second of said pair being formed to enable insertion of said elongated base of the second of said pair within said parallel side means of the first of said pair of elongated bases, and

projecting barb means including at least one projecting barb formed on one of said pair of elongated bases, and at least one receiving rib formed on the other of said pair of elongated bases for engaging said one projecting barb means to mount the thermal insulation blanket to the building flange.

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**4,590,728**

## SYSTEM FOR SUPPORTING AN EXTERNAL CORRUGATED ROOFING PANEL ON AN INSULATED ROOF STRUCTURE

**Jan Strömberg, Luleå, Sweden, assignor to Plannja AB, Luleå, Sweden**

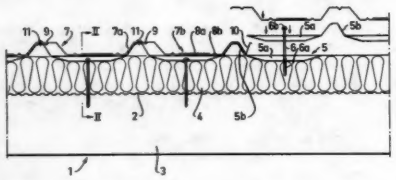
**PCT No. PCT/SE84/00040, § 371 Date Oct. 3, 1984, § 102(e) Date Oct. 3, 1984, PCT Pub. No. WO84/03118, PCT Pub. Date Aug. 16, 1984**

**PCT Filed Feb. 8, 1984, Ser. No. 662,409**

**Claims priority, application Sweden, Feb. 10, 1983, 8300717**

**Int. Cl.[4] E04B *5/00***

**U.S. Cl. 52—410** **14 Claims**



1. A system for securing a pre-shaped thin walled external roofing on a layer of medium-hard insulation supported on an underlying supporting roof structure comprising:

a securing strip;

groove-shaped portions relatively spaced on said securing strip for contacting engagement with the insulation;

crest-shaped portions relatively spaced on said securing strip and connecting adjacent groove-shaped portions;

securing members extending through said groove-shaped portions for extending through the insulation to the underlying supporting roof structure;

means to facilitate movement of said securing strip relative to said securing members in the direction toward and away from the underlying supporting roof structure; and

fastening members for securing the external roofing to said securing strip at said crest-shaped portions.

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**4,590,729**

## MODULAR CONSTRUCTION SYSTEM FOR THE ERECTION OF BUILDINGS

**Wafaa H. Hegazi, 50 Kasr El Nil St. (P.O. Box 1419), Cairo, Egypt**

**Filed May 2, 1984, Ser. No. 606,391**

**Claims priority, application Switzerland, Nov. 9, 1983, 6028/83**

**Int. Cl.[4] E04B *2/72***

**U.S. Cl. 52—437** **19 Claims**

1. A modular construction system for the erection of buildings, comprising:

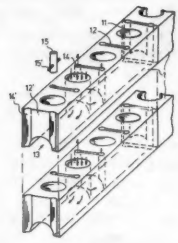
at least one hollow-core construction block structured to be mutually superposed with other such blocks without intervening mortar;

said at least one block being substantially quadrangular rectangular and including at least two substantially round, vertical through apertures arranged in predetermined spaced relationship in a direction extending longitudinally of the block;

said at least one block being provided with substantially vertical slots arranged in predetermined spaced relationship in a direction extending longitudinally of the block;

said vertical apertures being arranged in adjacent relationship to said substantially vertical slots;

said substantially vertical apertures and said vertical slots opening at a common set of ends thereof in said block into a longitudinal channel fashioned in said block to have an at least approximately semi-circular cross-section;



a predetermined number of said hollow-core construction blocks, when assembled to form a predetermined wall structure, conjointly forming a flow-communicating system by means of said vertical apertures, said vertical slots and said longitudinal channels; and

said flow-communicating system essentially extending in two mutually perpendicular directions through substantially the entire wall structure assembled from said hollow-core construction blocks and at least receiving a pourable, curable building material forming in its cured state a high-strength network vertically and horizontally extending through and thereby interconnecting said predetermined number of hollow-core construction blocks assembled to form said predetermined wall structure.

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**4,590,730**

## PANEL AND GUTTER ASSEMBLY

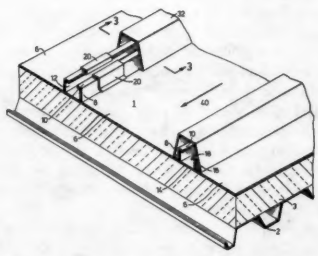
**Leonard E. Blendick, Toronto, Canada, assignor to Edward P. Minialoff, Schaumberg, Canada**

**Filed Apr. 10, 1985, Ser. No. 722,081**

**Claims priority, application Canada, May 8, 1984, 453855**

**Int. Cl.[4] E04C *1/34***

**U.S. Cl. 52—461** **18 Claims**



1. A roofing assembly comprising:

a plurality of panels, edge regions of which each comprise an

upstanding portion and an edge portion extending from an upper end of the respective upstanding portion towards an adjacent panel;

a plurality of gutters each of which has a bottom portion and sides defining a generally U-shaped cross-section and is open along a top thereof to collect water, and each of which is located between two panels with the upstanding portions of those two panels adjacent the sides of the gutter and with the two respective edge portions located on top of the gutter extending towards one another;

a plurality of clips for securing the gutters to the panels, each of the clips including a first clip portion holding a gutter and a respective edge portion together, and a second clip portion, the clips being arranged in pairs on either side of the gutter, with the second clip portions of each pair of clips extending out from the corresponding upstanding portions;

and a batten member having two limbs and a top section defining a generally inverted U-shape cross-section, the limbs being engaged by the second clip portions, to retain the batten member in position.

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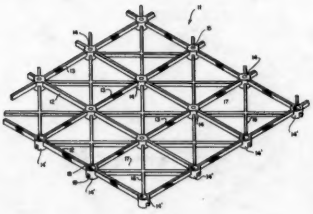
**4,590,731**

## TILE REINFORCING GRID

**Lonnie C. DeGooyer, 349 E. 5600 S., Murray, Utah 84107**

**Filed Aug. 10, 1983, Ser. No. 521,937**
**Int. Cl.[4] E04C *1/10***
**U.S. Cl. 52—581** **8 Claims**



1. A modular reinforcing structure for use in setting tile comprising:

a first and second series of primary strips arranged in intersecting relation to form a grid defining rectangular openings,

mounting posts having axial openings therein at the intersections of said first and second series of primary strips to provide uniform depth to the grid, said grids and posts being formed integrally with each other with the upper edges of said primary strips being in the approximate plane of the upper surfaces of the posts and the lower edges of said primary strips at the approximate midlength of the posts; and

secondary series of strips extending between posts on the diagnosis of the openings, the secondary strips intersecting at the approximate midpoints of the openings and having upper edges which lie in a plane below the upper edges of said primary strips.

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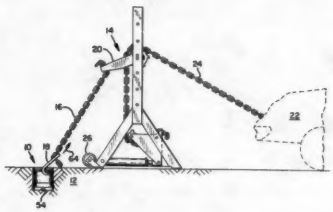
**4,590,732**

## ANCHOR DEVICE

**Ellis A. Hallman, P.O. Box 372, Lebanon, Oreg. 97355**

**Filed Jan. 9, 1984, Ser. No. 569,245**
**Int. Cl.[4] E04B *1/38*; E02D *5/74***
**U.S. Cl. 52—704** **9 Claims**

1. An anchor device adapted to be secured in a concrete floor for anchoring an apparatus such as a power post and the like comprising; an elongated unitary core having top and bottom ends and an intermediate main body portion of a determined length and outer configuration, a sleeve having top and bottom ends and an intermediate portion with a length and inside configuration substantially matching the outside configuration of the main body portion of the core and generally permitting sliding of the intermediate main body portion of the core a substantial distance into the intermediate portion of the sleeve whereby substantial surface to surface interfitting engagement of the core and sleeve is achieved throughout their corresponding lengths, said sleeve provided with an expandable section, expansion means provided between the sleeve and



core in the area of said expandable section to resist full seating of the core in the sleeve, and tool engaging means for drawing the core into the sleeve against the resistance to thereby expand the expandable section of the sleeve and seat the core in the sleeve, and attaching means for attaching the top end of the unitary core to the apparatus.

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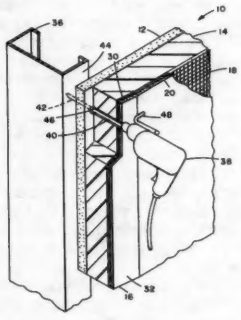
**4,590,733**

## CURTAIN WALL PANEL AND METHOD

**Joseph W. Schneller, Williamsville; Donald A. Kossuth, Buffalo, and J. Stephen Robinson, Williamsville, all of N.Y., assignors to National Gypsum Company, Dallas, Tex.**

**Filed May 28, 1985, Ser. No. 738,480**
**Int. Cl.[4] E04B *5/52***
**U.S. Cl. 52—741** **3 Claims**



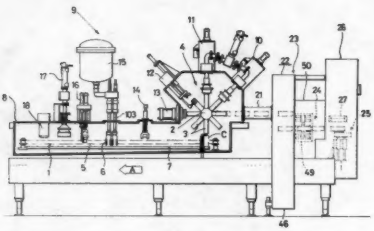
1. The method of erecting a curtain wall of a building comprising the steps of disposing a pair of studs in spaced parallel relation and screw-attaching, to said spaced parallel studs, a prefabricated laminated panel, said panel comprising three layers, the first layer being a sheathing board, the second layer being a plastic foam insulation board and the third layer being a latex-modified Portland cement layer within which there is embedded a web of fiber glass mesh, said screw-attaching of said panels being by a powered screw gun having a special attachment for guiding the depth to which screws penetrate in attaching said panels driving said screws with said screw gun completely through the panel third layer and the panel insulation board to a depth such that the head of said screw engages said sheathing board, holding said sheathing board, and thus said panel, firmly to said parallel studs.

4,590,734

## PACKAGING MACHINE

Kazuo Ueda, Tokyo, Japan, assignor to Shikoku Kakooki Co., Ltd., Tokushima, Japan

Filed Jun. 4, 1984, Ser. No. 616,647
Int. Cl.[4] B65B 3/02
U.S. Cl. 53—52 10 Claims



1. A packaging machine comprising:

an endless conveyor (1);

a mandrel wheel (4) disposed above a starting end of a path of transport of the conveyor and having a plurality of mandrels (3);

a closed main chamber (8) entirely enclosing the conveyor (1) and the mandrel wheel (4), said main chamber having a top wall, a rear end, a forward end, and a bottom wall;

a series of devices (9) arranged on the top wall of the main chamber (8) from the rear ends towards the forward end for making tubular blanks C into containers by closing one end of each blank to form a bottom of the container, filling contents into the bottomed blank, and thereafter closing the other end of the blank to form the top of the container, the series of devices having portions operative on the blank C and extending into the main chamber (8); and

a closed subchamber (22) disposed at the rear end of the main chamber (8) and communicating therewith and having a rear end and a forward end, said subchamber having installed therein a blank sterilizer (23) and a blank transfer assembly (24) for transferring tubular blanks C from a blank shaping-feeding unit (25) to the blank sterilizer (23) and for transferring sterilized tubular blanks C from the sterilizer (23) to the mandrel wheel (4);

said subchamber comprising a drying compartment (46) and a sterilizing compartment (49), said drying compartment having a front portion, a rear portion, and a blnak outlet (45) at said front portion communicating with the rear end of the main chamber (8), said sterilizing compartment having a front portion communicating with the rear portion of the drying compartment through a communication opening (47), a rear portion, and a blank inlet (48) at said rear portion thereof;

said blank sterilizer comprising a drying conveyor (51) disposed within the drying compartment (46), a sterilizing conveyor disposed within the sterilizing compartment (49), hot air blowing nozzles arranged along a path of transport of the drying conveyor (51), and a blank sterilizing nozzle (54) directed toward a path of transport of the sterilizing conveyor (52);

said drying conveyor (51) comprising drive and driven sprockets (55, 56) having axes of rotation spaced apart by a predetermined distance one above the other and extending in a direction aligned with said front and rear ends of said main chamber, endless chains (57) reeved around the sprockets (55, 56), and a multiplicity of drying blank holders (58) attached to the endless chains (57) at a predetermined spacing, the drying blank holders being adapted to travel through and stop at positions opposed to the blank outlet (45) and to the communication opening (47);

sterilizing conveyor (52) comprising a horizontal rotary shaft (59) extending in a direction aligned with said front and rear ends of said main chamber, and sterilizing blank holders (60) attached to said rotary shaft (59) arranged around the shaft at a predetermined spacing, the sterilizing blank holders (60) being adapted to travel through and stop at a position opposed to the communication opening (47) and to the blank inlet (48), the drying and sterilizing blank holders (58 and 60) being adapted to restrain the tubular blanks C from upward or downward movement but allow the blanks to move in a forward or rearward direction relative to the respective front and rear portions of the drying compartment and the sterilizing compartment, respectively;

said blank transfer assembly (24) comprising a plurality of pawls (79, 80, 81) movable in said forward and rearward directions at a predetermined stroke length and respectively engagable with and disengagable from blanks C held by the drying and sterilizing blank holders (58, 69) stopped at said positions.

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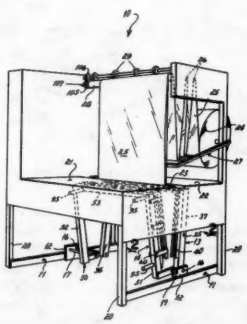
4,590,735

## VERTICAL PACKAGING MACHINE

Hans A. Dohrendorf, Anderson, S.C., assignor to Nordson Corporation, Amherst, Ohio

Filed Oct. 18, 1984, Ser. No. 662,278
Int. Cl.[4] B65B 9/08, 57/00
U.S. Cl. 53—77 9 Claims



1. In a vertical bagger having means for supplying a folded film into which a product can be inserted, a clamping, cutting and sealing assembly comprising,

a base,

a generally vertical inverted U-shaped clamping jaw pivoted at one end to said base,

a generally vertical inverted U-shaped sealing frame pivoted to said base adjacent said clamping jaw,

an L-shaped sealing knife mounted on said sealing frame for reciprocation toward and away from said clamping jaw,

said sealing knife having a vertical leg and a horizontal leg,

power means for applying a voltage to said sealing knife to heat said knife,

means for moving said clamping jaw and sealing frame together,

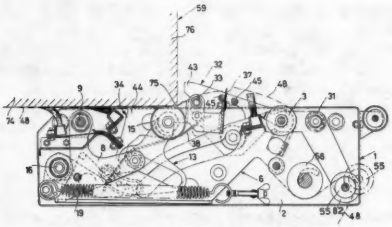
means for moving said sealing knife toward said clamping jaw when said clamping jaw and sealing frame are together, said sealing knife cutting said film vertically and transversely and forming a transverse seal and a vertical seal along the free edges of said film to complete the formation of a package.

4,590,736

## AUTOMATIC TAPING UNIT WITH IMPROVED CUTTING SYSTEM FOR CARTON SEALING MACHINES

Augusto Marchetti, Piazza Sicilia 7, 20146 Milano, Italy

Filed Oct. 16, 1985, Ser. No. 788,221
Claims priority, application Italy, Oct. 17, 1984, 23191 A/84
Int. Cl.[4] B65B *51/06, 1/04*
U.S. Cl. 53—137 7 Claims



1. Automatic taping unit for carton sealing machines, comprising a casing adapted to be fixed to a sealing machine along the carton advancement path, an inlet applying roller and an outlet applying roller elastically urged to project from said casing to be engaged and forced to return into said casing by the front of an advancing carton, an adhesive tape supply arranged to put, at rest, a free end of the tape in contact with said inlet roller in order to be engaged and adhesively drawn forward by the carton front and further realized in such a way as to allow subsequently said tape to follow the drawing of said free end and to slide on said inlet roller to extend adhesively along the adjacent horizontal wall of the carton, and a cutting blade arranged between said inlet and outlet rollers and provided with actuating means capable of causing it to return into the outline of said casing before being reached by the carton front and to project from said outline for cutting the tape between said inlet and outlet rollers after having been overcome by the rear wall of the carton and before said horizontal wall of the carton abandons said outlet roller, characterized in that said actuating means of the cutting blade comprise first lever means pivoted on said casing and elastically urged to have an actuating portion projecting from said casing in order to be engaged and forced to return into said casing by said horizontal wall of the carton and second lever means which support said cutting blade and are pivoted on said first lever means and elastically urged with respect to the latter in such a way as to keep said cutting blade in the outline of said first lever means and to have an actuating portion projecting from said casing downstream of said actuating portion of the first lever means in the direction of advancement of the carton, the pivot between said first and second lever means being chosen in such a way that the releasing of said actuating portion of said first lever means by said horizontal wall of the carton while said actuating portion of the second lever means is still engaged by said horizontal wall of the carton causes the sudden projection of the cutting blade from the outline of said casing and said first lever means.

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4,590,737

## APPARATUS AND METHOD FOR ROLL WRAPPING ARTICLES

Henry Rosenthal, and Howard E. Kronhaus, both of Boca Raton, Fla., assignors to HaDiHo, Pompano Beach, Fla.

Filed Aug. 30, 1984, Ser. No. 645,712
Int. Cl.[4] B65B *11/04*
U.S. Cl. 53—211 24 Claims

1. An apparatus for wrapping articles which comprises:

(a) a frame;

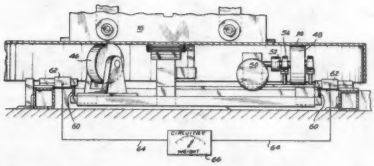
(b) a platform rotatably mounted on said frame and means for rotating said platform about a substantially vertical axis;

(c) at least two elongated support rollers mounted in spaced relation on said rotatable platform for rotation about substantially horizontal axes extending therethrough;

(d) a supply of web-type wrapping material mounted on said frame, said wrapping material supply being positioned and adapted for dispensing and wrapping about an article supported on said horizontally rotatable rollers as said platform rotates about a vertical axis;

(e) means for selectively moving said supply of wrapping material in an upward and downward direction so as to selectively vary the vertical height at which said wrapping material is dispensed from said wrapping material supply;

(f) means for rotatably driving at least one of said substantially horizontal rollers in either of two directions of rotation such that an article to be wrapped rotates about a substantially horizontal axis when said driven support roller is rotated in a first direction and said rotating article engages said other horizontal support roller and thereby rotates said other support roller in the same direction as said first driven roller;



(g) means for selectively varying the spacing between said horizontal rotatable support rollers by substantially equal and opposite movements respectively toward or away from each other to maintain said article in substantially the same location with respect to said frame and thereby providing capability to support articles of numerous sizes and weights; and

(h) weighing means positioned between said rotatable platform and said frame for generating a signal which corresponds to the weight of an article positioned on said frame so as to thereby provide the weight of the article while said article is on said support rollers.

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4,590,738

## APPARATUS FOR LOADING AND UNLOADING A FILM CASSETTE, IN PARTICULAR AN X-RAY FILM CASSETTE

Peter Hösel, Munich, and Herbert Plaschke, Gernlinden, both of Fed. Rep. of Germany, assignors to Agfa-Gevaert AG, Leverkusen, Fed. Rep. of Germany

Filed Aug. 29, 1983, Ser. No. 527,307
Claims priority, application Fed. Rep. of Germany, Aug. 30, 1982, 3232187
Int. Cl.[4] B65G *65/04*
U.S. Cl. 53—266 R 13 Claims

1. Apparatus for loading and unloading a film cassette, in particular a X-ray cassette, comprising:

a housing defining a compartment and including a front face having an opening to the compartment through which opening the cassette is introduced;

means for transporting the cassette into the compartment and for discharging the cassette from the compartment;

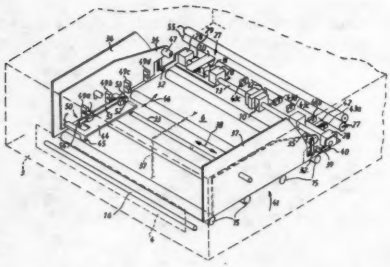
first means for identifying the length of the cassette for providing a corresponding actual value thereof;

second means for identifying the width of the cassette for providing a corresponding actual value thereof;

means for comparing the actual values provided by the first

and second identifying means with stored nominal values of concrete sizes of cassettes; and

means for removing the film from the cassette and loading the cassette with a new film in dependence upon the comparison provided by the comparing means, the first identifying means including a controller drum extending parallel to the opening within the compartment and being actuated upon introduction of the cassette through the opening, the controller drum remaining in the actuated state when the inserted cassette is of a too long size thereby causing the comparing means to reverse the transporting means for discharging the cassette, said housing accommodating a side plate arranged perpendicularly to



the opening and extending into the compartment, the first identifying means further including a shifting device actuated when the controller drum is turned off and having a slide member movable transversely to the insertion direction of the cassette towards the side plate for positioning the cassette, a first plurality of light barriers arranged parallel to the transverse movement of the slide member, each of the light barriers being arranged at a location corresponding to a predetermined length of the cassette, and a first lug movable with the cassette when the slide member moves the cassette towards the side plate, and cooperating with the first plurality of light barriers so as to determine whether or not the cassette corresponds to a predetermined length.

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**4,590,739**

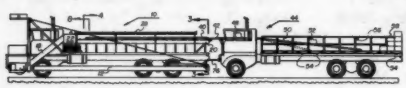
## FIELD CROP HARVESTING SYSTEM

**C. Alex Abatti, and Robert Urmston, both of 1296 W. Evan Hewes Hwy., El Centro, Calif. 92243**

**Continuation-in-part of Ser. No. 431,905, Sep. 30, 1982, which is a continuation-in-part of Ser. No. 159,941, Jan. 16, 1980, Pat. No. 4,292,784. This application Nov. 17, 1983, Ser. No. 552,716**

**Int. Cl.[4] A01D** *90/00*

**U.S. Cl. 53—391** **12 Claims**



1. An apparatus for harvesting, packing and transporting field crops, comprising:

(a) a harvesting machine having means to propel same through the fields and also having a collecting system for conveying crops to a packing area on said machine;

(b) a self-propelled vehicle releasibly linkable to said machine such that said shuttle trails said machine through the fields when linked therewith, said shuttle having a crop preparation area where crops are prepared for shipping;

(c) a conveyor system for conveying harvested crops from said packing area on said machine to said crop preparation area on said shuttle vehicle, whereby crops can be prepared for shipping on said vehicle and when said vehicle has a full load, it can be released from said machine to transport crops to a freight depot;

(d) said conveyor system for conveying harvested crops being separable into forward and rear portions carried on the machine and shuttle truck, respectively, said forward portion comprising a powered longitudinal full box conveyor terminating rearwardly in a rearward bridge spanning to said rear portion, said bridge being raisable to separate said forward and rear conveyor system portions; and,

(e) a roller cam pivoted on an arm and operated by an elongated handle to raise and lower said bridge, said roller cam being rotatable on a shaft and said handle sliding axially on said shaft to selectably engage or disengage same to permit the lowering of said handle into idle position when not in use.

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**4,590,740**

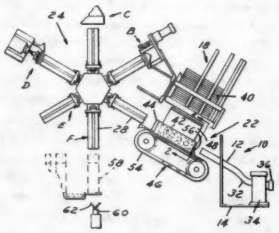
## CONTAINER STERILIZATION APPARATUS AND METHOD

**Frank A. Rodocker, Milford, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.**

**Continuation of Ser. No. 514,373, Jul. 15, 1983, abandoned. This application Aug. 27, 1985, Ser. No. 769,650**

**Int. Cl.[4] B65B** *55/04*

**U.S. Cl. 53—426** **3 Claims**



2. A method for producing a sterilized paperboard container to be filled with a liquid, in which a folded-over, flattened four-sided blank with its free edges sealed together is pulled by suction means from the bottom of a stack of blanks in a magazine on a forming, filling and sealing machine; opened into an open-ended tubular blank; and placed on one of its sides on conveyor means for being conveyed toward and onto a mandrel of an indexing mandrel assembly, characterized by drawing a sterilant from a source under pressure into a nebulizing nozzle, and dispensing said sterilant in a fog state via the nozzle into the rear open end of and through the tubular blank while the blank is being conveyed by said conveyor means toward and onto said mandrel to thereby provide a maximum sterilizing time for each blank and serve to sterilize said indexing madel assembly.

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**4,590,741**

## SKIN PACKAGING PROCEDURE USING LAMINATED ANTI-STATIC MATERIAL

**Stuart G. Long, South Laguna, and Michael J. Maciocia, Ontario, both of Calif., assignors to General Dynamics Pomona Division, Pomona, Calif.**

**Division of Ser. No. 597,975, Apr. 9, 1984, Pat. No. 4,554,210. This application Jul. 22, 1985, Ser. No. 757,635**

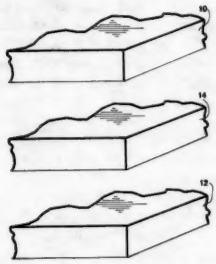
**Int. Cl.[4] B65B** *11/52*

**U.S. Cl. 53—427** **1 Claim**

1. In a skin-packaging procedure wherein an electrostatically-sensitive item is skin-packaged by heating a heat-sealable plastic film to a semi-molten state, drawing a vacuum between

the film, the item to be packaged, and a coated substrate, and then drawing the film over and around the item to form a heat-sealable bond with the coated substrate, the improvement comprising:

an electrostatic-resistant, heat-sealable, plastic film including first and second outer layers of heat-sealable, electrically semi-conductive polyethylene, each having a surface resistivity exceeding $1\times10^{16}$ ohms per square, and a middle layer of heat-sealable polyethylene sandwiched between and bonded to said first and second outer layers and impregnated with a sloughable, electrically-conductive material providing said middle layer with a volume resistivity no more than $1\times10^{3}$ ohms per centimeter, wherein said electrically-conductive material is prevented from sloughing to contaminate said item by said first or said second semiconductive polyethylene layer.



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**4,590,742**

## METHOD AND MACHINE FOR PACKING A ROPE INTO A CONTAINER

**Stig H. Akesson, Örenäs, Västanväg, S-237 00 Bjärred, Sweden**

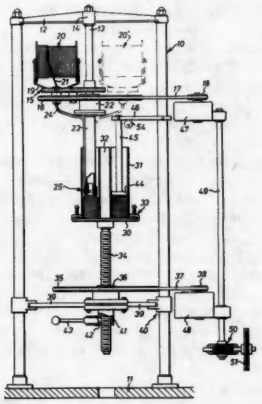
**PCT No. PCT/SE82/00191, § 371 Date Jan. 21, 1983, § 102(e) Date Jan. 21, 1983, PCT Pub. No. WO82/04239, PCT Pub. Date Dec. 9, 1982**

**PCT Filed May 28, 1982, Ser. No. 463,866**

**Claims priority, application Sweden, May 29, 1981, 8103394**

**Int. Cl.⁴ B65H *54/76***

**U.S. Cl. 53—430** **9 Claims**



1. A method of packing a rope (21) into a container (31) in such a manner as to permit easy extraction of the rope therefrom, comprising the steps of providing a supply reel (20) of rope (21); providing a container (31) wherein rope withdrawn from said supply reel (20) is to be coiled; providing a winding head (25) having a fixed central piece (29) and tubular pulling means (26) disposed about said central piece (29) so as to define a gap (57) in which said rope (21) may be frictionally received, said pulling means (26) being rotatable about said central piece (29) to cause rope received in said gap (57) to move at least part of a turn about said central piece (29) and exit from a lower end of said gap (57) as a coil; positioning said winding head (25) relative to said container (31) so that said coil has a centre situated between the centre line and periphery of said container (31); connecting rope (21) from said supply reel (20) to said winding head (25); rotating said pulling means (26) about said central piece (29) to withdraw rope (21) from said supply reel (20) and coil the rope (21) within container (31); rotating said container (31) about its axis and simultaneously moving said container axially relative to the winding head (25); and rotating said rope (21) about its longitudinal axis on its way into the container (31).

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**4,590,743**

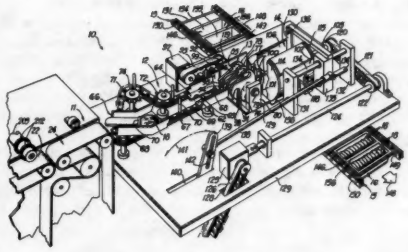
## TRAY LOADING METHOD AND APPARATUS

**Timothy W. Hardage, Athens, Ga., assignor to Food Machinery Sales, Inc., Athens, Ga.**

**Filed Dec. 3, 1984, Ser. No. 677,745**

**Int. Cl.⁴ B65B *35/44, 35/50***

**U.S. Cl. 53—446** **26 Claims**



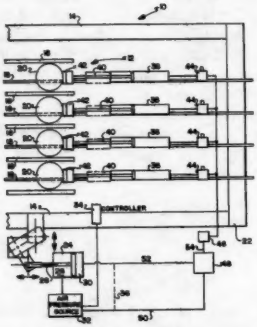
1. A method of loading cookies and the like each having substantially flat bottom surface and an opposed irregularly shaped upper surface in a receptacle comprising the steps of moving a plurality of cookies each resting on its bottom surface in an aligned random spaced series with a first surface conveyor means at a first velocity toward a second surface conveyor means, transferring the cookies from the first surface conveyor means to the second surface conveyor means with the cookies each resting on its bottom surface on the second surface conveyor means, moving the cookies with the second surface conveyor means at a second velocity which is less than the first velocity to receive the cookies on the second surface conveyor means in edge abutment with respect to one another, transferring the cookies from the second surface conveyor means to a third surface conveyor means with the cookies each resting on its bottom surface on the third surface conveyor means, moving the cookies with the third surface conveyor means at a third velocity which is greater than the second velocity to a reorienting means, retrieving the cookies with the reorienting means from the third surface conveyor means and placing a predetermined number of cookies with the reorienting means in an edge stacked relationship in a cell of a transfer member and engaging with the reorienting means the flat bottom surface of each cookie to urge each cookie into the cell of the transfer member, transferring the stack of cookies from the transfer member to a cell of a receptacle.

4,590,744

## PNEUMATIC BOTTLE STOP

Robert W. McGill, Munroe Falls, Ohio, assignor to Figgie International Corporation, Richmond, Va.

Filed Nov. 2, 1984, Ser. No. 667,920
Int. Cl.[4] B65B *57/10*
U.S. Cl. 53—497 19 Claims



1. In a case packer having a packing head comprising a plurality of lanes for receiving moving articles therein, a support member in the lanes for supporting the articles, and an actuator connected to the support member in the lanes for selectively shifting the support member and dropping the articles, the improvement of an article stop, comprising:

reciprocating means associated with each of the lanes for making contacting engagement with the articles being received in the lanes, absorbing and dissipating energy from the moving articles, and stopping the articles, said reciprocating means comprising a cylinder having a piston therein, said cylinder connected to a source of pressure; and

wherein said source of pressure comprises a first valve connected to the actuator, selectively receiving air under pressure therefrom and directing said air under pressure to said cylinder and extending said piston to a first position.

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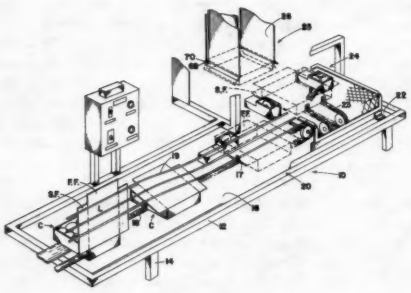
4,590,745

## CARTON CLOSING MACHINE

Arthur E. Randles, 4617 S. 3rd Ave., Tucson, Ariz. 85714

Filed Oct. 12, 1983, Ser. No. 541,299
Int. Cl.[4] B65B *35/30*
U.S. Cl. 53—541 4 Claims



1. Apparatus for performing work on a carton, including a frame, a conveyor member on said frame with conveyor lugs thereon to engage an upright trailing panel of a formed carton to move said carton along a carton support surface from a pick-up point; and means for delivering cartons to said conveyor member comprising:

a pair of parallel, generally horizontal, receiving belts for receiving incoming cartons at one end of said apparatus;

a pair of parallel, generally horizontal smooth transfer belts immediately downstream of said receiving belts, and extending beyond said pick-up point alongside said conveyor member to deliver cartons thereto;

a back-up chain with transfer lugs thereon extending between and parallel to said receiving and transfer belts from ahead of the downstream end of said receiving belts to beyond said pick-up point;

said receiving belts being at an elevation so that said transfer lugs pass under cartons supported thereon and said transfer belts being at an elevation so that said transfer lugs extend above the surface thereof to engage the trailing panels of cartons supported thereon;

said transfer belts and said back-up chain being driven at the same velocity, greater than that of said receiving belts;

a shaft along and parallel to said transfer belts;

a stop arm slidable along said shaft;

means releasably securing said stop arm in a selected position along said shaft;

said stop arm being normally positioned to extend above the surfaces of said transfer belts in alignment with cartons thereon to be engaged by the leading panel of a carton supported thereon; and

means for rotating said shaft partially at regular intervals to pivot said stop arm momentarily out of alignment with a carton on said transfer belts to enable said transfer belts to move said carton forward.

4. A carton closing machine for closing a carton with a horizontal cover having a front flap and two side flaps joined to said cover by folding lines, comprising:

a frame;

a longitudinal drive chain movable on said frame and having lugs thereon to engage the trailing upright panel of carton and move said carton in a longitudinal path parallel to said front flap fold line along a carton support surface past one seal station;

a cross-feed chain beyond the downstream end of said drive chain having lugs thereon to engage an upright panel of said carton which is disposed parallel to said longitudinal path and move said carton in a lateral linear path past another seal station;

a first seal system at said one seal station operative to provide a line of adhesive material across the front flap of a carton moving along said adjacent path;

second and third seal systems at said another seal station operative to apply lines of glue to the side flaps of a carton moved thereby; and

means for folding down said front and side flaps;

each of said seal systems comprising:

a glue container; and

a glue wheel rotatable in said glue container about a horizontal axis normal to the direction of carton travel;

the periphery of said glue wheel being engageable by a flap of a carton moving thereby; and

said means for folding comprising:

a vertically reciprocating elevator at the downstream end of said lateral chain to receive cartons therefrom when in its down position; and

a stack having vertical back and side walls extending upward from above said down position to engage and fold down the front and side flaps of a carton raised by said elevator;

a sub-frame; a vertical front wall mounted on said frame opposite said vertical back wall to restrain cartons being lifted in said stack; and hinge means mounting said subframe on said frame to enable said stack to be pivoted back away from wall;

said stack side walls being spaced from said back wall so that the vertical edges of said side and front flaps do not engage a vertical wall of the stack;

said one glue station being situated near the downstream end of said longitudinal drive chain: and

said cross-feed chain having a relatively short run to said elevator.

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4,590,746

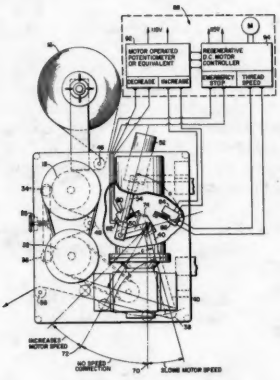
## CONSTANT TENSION STRETCH WRAPPING MACHINE

John R. Humphrey, Naples, Fla., assignor to International Packaging Machines, Inc., Naples, Fla.

Continuation-in-part of Ser. No. 307,283, Sep. 30, 1981, abandoned. This application May 4, 1982, Ser. No. 374,741

Int. Cl.[4] B65B *11/04*

U.S. Cl. 53—556 9 Claims




1. A constant tension stretch wrapping machine for wrapping a load comprising:

a dispensing means for dispensing stretchable wrapping material;

a turntable for supporting and rotating the load to be wrapped;

a tension maintaining means disposed between the dispensing means and the turntable, said tension maintaining means including;

a first arm pivotably mounted for rotation around a fixed point through a path of rotation;

a first roller rotatably mounted on the first arm at a point offset from the fixed point, the first roller engaging the stretchable wrapping material to define a path of approach of the stretchable wrapping material between the dispensing means and the first roller;

a second roller rotatably mounted at a point between the first roller and the turntable which engages the stretchable wrapping material during wrapping of the load and which defines a path of departure of the stretchable wrapping material between the first roller and the second roller;

the first arm defining a first angle with the path of approach of the stretchable wrapping material and a second angle with the path of departure of the stretchable wrapping material, the first and second angles being substantially equal within the path of rotation and varying with rotation of the arm through the path of rotation;

a second arm pivoted about the fixed point and connected to the first arm; and

means for applying a constant force to the second arm at a point offset from the pivot point which opposes a force applied to the first arm by tension on the wrapping material in the paths of approach and departure, the second arm and the means for applying a constant force defining a third angle which is substantially equal to the first and second angles within the path of rotation of the first arm.

4,590,747

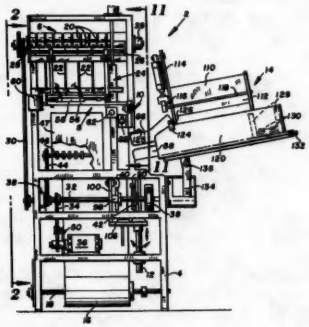
## POSITIVE DISPLACEMENT FILLING MACHINE

Gilmore T. Schjeldahl, Minnetonka, Minn., assignor to Robert Alameda, Salinas, Calif.

Filed May 11, 1984, Ser. No. 609,344

Int. Cl.[4] B65B *43/04*

U.S. Cl. 53—562 11 Claims



1. Packaging apparatus for forming and filling an integrally prepared bag comprising:

frame means of a generally rectangular box-like construction;

a first means for sealing and severing a folded web of film material;

bag forming means secured to said frame including clamping means for releasably holding the opposite folded sides of said film and second means for spreading an open side of said web, said spreading means including a first spring member formed into an inverted "V" shape, said flat spring member being vertically movable relative to a stationary member attached to said frame for controllably spreading the open side of said web as said first folded web is moved past said first means and said flat spring member is raised and lowered relative to said stationary member, said first means sealing and severing a predetermined width of said film from said web to form a bag with an open end;

bag filling means for receiving and supporting the formed bag before filling said bag with a measured amount of product; and

control means for synchronously operating said bag forming means relative to said bag filling means.

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4,590,748

## MACHINE FOR AND METHOD OF PACKAGING ARTICLES OR GOODS

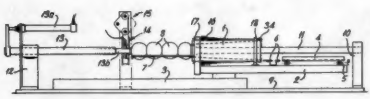
Roy Harrison, Stoke-on-Trent, and John D. Turner, Heywood, both of England, assignors to National Research Development Corporation, London, United Kingdom

Filed Jun. 29, 1984, Ser. No. 626,042

Claims priority, application United Kingdom, Jul. 1, 1983, 8317928

Int. Cl.[4] B65B *43/42*

U.S. Cl. 53—576 5 Claims



1. A machine for forming a single package of a plurality of

discrete articles within packaging material supplied in the form of a flexible tube, comprising:

a tubular shuttle means having first and second open ends spaced along an axis and, mounted to reciprocate parallel said axis and presenting an outer surface adapted to support a length of the material with its free end closed;

support means attached to and movable with the shuttle for supporting the whole weight of the articles immediately prior to a packaging operation in an arrangement that is coaxial with the shuttle, outside but adjacent said first open end;

means to reciprocate the shuttle and said attached support means;

means to restrain the articles from moving with the shuttle and the support means as they reciprocate, whereby on a forward stroke of that reciprocation in which the first open end leads, said support means move away from said articles and the shuttle passes the articles and material is drawn from it, closed end first, to form a tubular package around the articles as they emerge from the second open end;

means then operable to cut and seal the package around the articles, and reseal the free end of the length of the material that remains supported on the shuttle.

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**4,590,749**

## APPARATUS FOR AND METHOD OF SHIRRING A TUBULAR CASING

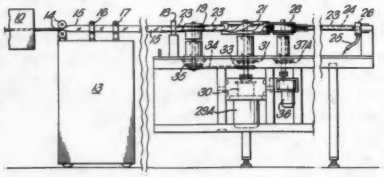
**Stephen Temple; Nigel J. Jones, and Alan N. Syrop, all of Cambridge, England, assignors to Devro, Inc., Somerville, N.J.**

**Filed Mar. 22, 1985, Ser. No. 714,670**

**Claims priority, application United Kingdom, Mar. 30, 1984, 8408330**

**Int. Cl.[4] A22C *13/02***

**U.S. Cl. 53—576** **7 Claims**



1. Apparatus for shirring a tubular casing including at least one pair of toothed shirring wheels, each of said wheels having a plurality of teeth, each tooth in said wheel being formed with a groove in a radial plane of substantially semicircular cross section in the outer face of the wheel, each tooth having a crest surface which is part of said groove and is uniform at all points around the shirring wheel, and in which the wheel has flexible outer walls which extend upwardly from the face of the teeth around the circumference of the wheel and in which the teeth on said shirring wheel contact the casing to be shirred when the leading edge of adjacent teeth contacting the casing are at an angle past the bottom dead center position defined by the equation

$$A=\cos^{-1}(R-r)/R$$

in which R is the minimum radius of the tooth from the axis of the wheel and r is the radius of the casing to be shirred.

**4,590,750**

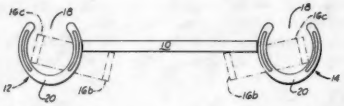
## SADDLE STIRRUP SETTING DEVICE

**Clady J. Royer, II, 2808 Meridian Ct., Oklahoma City, Okla. 73127**

**Filed May 4, 1984, Ser. No. 607,228**

**Int. Cl.[4] B68C *3/00***

**U.S. Cl. 54—46** **4 Claims**



1. A saddle stirrup setting device comprising:

an elongated rod: and

a pair of open-sided stirrup engaging elements secured to opposite ends of said elongated rod, and each including a stirrup stop web portion offset from the longitudinal axis of the rod and cooperating with the rod to retain a stirrup with one one side bearing against the rod, and an opposite side bearing against the web portion in an open riding attitude in which the open face of the stirrup extends substantially parallel to the axis of the rod, said web portion being offset from the axis of said elongated rod by a distance which is substantially equal to the transverse width of the stirrup to be set.

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**4,590,751**

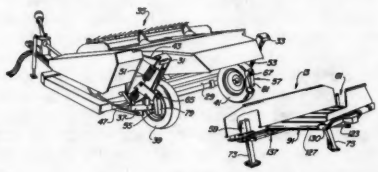
## DOUBLE WINDROWING ATTACHMENT FOR HARVESTER

**Roger D. Stephenson, Bloomfield, Iowa, assignor to Deere & Company, Moline, Ill.**

**Filed Jun. 20, 1984, Ser. No. 622,364**

**Int. Cl.[4] A01D *57/20***

**U.S. Cl. 56—192** **25 Claims**



1. In a windrowing attachment for a harvester comprising:

a frame;

a conveyor movably mounted on said frame; and

means for shifting said conveyor back and forth on said frame between a first crop discharge position for forming a windrow inboard of one side of the harvester and a second crop discharge position for forming a windrow along the opposite side of the harvester; the improvement comprising:

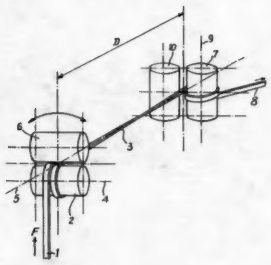
said shifting means comprising (a) a track fixed to said conveyor and (b) a shift arm pivotably mounted at one end to said frame and movably mounted at the other end in said track.

4,590,752

## METHOD AND DEVICE FOR THE MANUFACTURE OF FLEXIBLE TUBULAR BODIES

Jean P. Aubert, Puteaux; Roland Bracon, La Maillerayе sur Seine, and Bernard Ravasy, Caudebec en Caux, all of France, assignors to Coflexip, Paris, France

Continuation of Ser. No. 506,355, Jun. 21, 1985, abandoned.
This application Sep. 25, 1985, Ser. No. 780,701
Claims priority, application France, Jun. 22, 1982, 82 10880
Int. Cl.[4] B21F *3/04, 7/00;* B65H *81/08*
U.S. Cl. 57—9 19 Claims



1. A method of making a flexible tubular body in which at least one profiled strand is permanently deformed heliocidally before winding the strand helically to form a cylindrical carcass, said method comprising passing the profiled strand flat against and at least partially around a face of a first roller rotatable about a first axis, and then passing the profiled strand flat against and at least partially around a face of a second roller spaced from the first roller, and rotatable about a second axis which is angularly offset with respect to the first axis, wherein the profiled strand is wound at least one turn around at least one of the rollers, said faces of said rollers each having a profile corresponding to the profile of a surface of the strand which engages the roller faces, so that the strand is twisted axially in the space between the two rollers and acquires a permanent helicoidal deformation.

8. Apparatus for making a flexible tubular body composed of a helically wound strand of non-circular section comprising, a first roller having a circumferential surface of a profile corresponding to the profile of a surface of the strand, said first roller being rotatable about a first axis, a second roller spaced from the first roller and having a circumferential surface of a profile corresponding to the profile of a surface of the strand, said second roller being rotatable about a second axis angularly offset from said first axis, said strand being fed to and extending at least one full turn around said first roller, a length of the strand extending between the first roller and the second roller, and said strand extending at least one full turn around said second roller, said first and second rollers and said circumferential surfaces comprising means for axially twisting said length of the strand between said rollers to permanently deform the strand helicoidally, and means downstream of said second roller for winding the deformed strand into a flexible tubular body.

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4,590,753

## PROCEDURE FOR THE MECHANICAL SPLICING OF TEXTILE YARNS

Luciano Bertoli, Salo' ; Roberto Badiali, and Claudio Speranzin, both of Pordenone, all of Italy, assignors to Officine Savio S.p.A., Pordenone, Italy

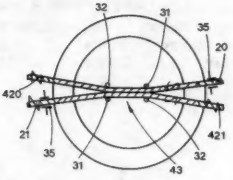
Filed Aug. 3, 1984, Ser. No. 637,570
Claims priority, application Italy, Aug. 5, 1983, 83443 A/83
Int. Cl.[4] B65H *69/06;* D01H *15/00*
U.S. Cl. 57—22 23 Claims

1. In a process for splicing yarns involving coupling two single yarns having portions each bearing a twist of a sign opposite the sign of the original twist and thereafter reimparting the original twist to the yarn portions, said process comprising

(a) providing two single yarns,

(b) untwisting a portion of each of said two single yarns until there results a twist having a sign opposite to the sign of the original twist,

(c) placing the fibers of said yarns in substantially parallel array,



(d) subjecting the substantially parallel fibers to a plucking and/or tearing action along the axis of said yarns, to form tails having a taper,

(e) positioning said tails along said yarns,

(f) coupling said yarns, and

(g) retwisting the coupled yarns at the untwisted portions to form a desired twist, the improvement comprising

subjecting at least that portion of said yarns that is untwisted to drawing during at least the untwisting step (b) and at least at about the transient stage of conversion from one type of twist to the twist of the opposite sign.

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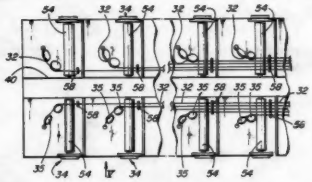
4,590,754

## FORMING CABLE CORE UNITS

Jean Bouffard, Lachine; André Dumoulin, Montagnes, and Marc Séguin, Ile Perrot, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Dec. 27, 1983, Ser. No. 565,634
Int. Cl.[4] D01H *1/04, 1/10, 7/86, 13/10*
U.S. Cl. 57—58.55 5 Claims



1. Apparatus for making a core unit from twisted units of individually insulated conductors comprising:

a plurality of twisting machines each for carrying a plurality of reels of insulated conductor and for twisting the conductors together to form a twisted unit;

a core unit forming and take-up means in tandem with the twisting machines along feedpaths for the twisted units to draw the twisted conductor units together to form a core unit;

the forming and take-up means comprising drawing means to draw twisted units into the forming and take-up means; and a tension equalizing means comprising a series of rotatable means disposed along the feedpaths for the twisted units, one rotatable means associated with each twisting machine and disposed between its twisting machine and the forming and take-up means, and drive means controlled to drive each rotatable means, said drive means having a drive speed dependent upon the drive speed of the drawing means to ensure that the unrestrained periph-

eral speed of each rotatable means is in excess of the draw speed of the twisted units into the forming and take-up means, lengths of the peripheral surface of each rotatable means presented to the feedpaths being insufficient to impart a driven speed to the twisted units above that of the draw speed into the forming and take-up means.

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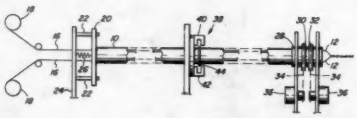
4,590,755

## LOW FATIGUE APPARATUS FOR STRANDING WIRE

John N. Garner, Kingston, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Mar. 11, 1985, Ser. No. 710,349
Int. Cl.[4] H01B *13/04*
U.S. Cl. 57—293 5 Claims



1. A tubular means for use in apparatus for twisting wires together and providing at least two feedpaths for the wires by defining at least one passage along the tubular means, the means comprising an outer layer of a first material and an inner and thinner layer of a second material surrounding the or each passage, the two layers bonded together with the characteristics of the materials such that the inner layer is abrasion resistant and is less deformable and more rigid than the outer layer while the flexibility of the structure enables the tubular means to be rotationally flexed about a longitudinal axis to torsionally twist the tubular means alternately in one direction and then in the other while causing the feedpaths to follow a helical path around said axis.

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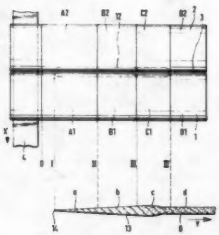
4,590,756

## OPEN-END FRICTION SPINNING

Fritz Stahlecker, Josef-Neidhart-Strasse 18, 7347 Bad Überkingen, Fed. Rep. of Germany, assignor to Hans Stahlecker and Fritz Stahlecker, Fed. Rep. of Germany

Filed Aug. 2, 1985, Ser. No. 761,683
Claims priority, application Fed. Rep. of Germany, Aug. 10, 1984, 3429513
Int. Cl.[4] D01H *1/135, 7/882*
U.S. Cl. 57—401 11 Claims



1. An open-end friction spinning machine having two adjacently arranged friction rollers drivable in the same rotational direction and forming a wedge-shaped yarn-forming gap,

said rollers having a plurality of axial sections exhibiting different frictional effects,

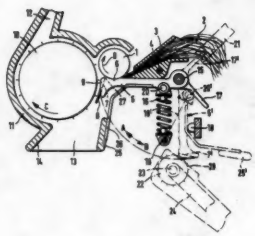
said sections of each said roller disposed opposite one another having differing surface characteristics yielding different frictional effects.

4,590,757

## FEEDING AND OPENING DEVICE FOR AN OPEN-END SPINNING MACHINE

Fritz Stahlecker, Josef-Neidhart-Strasse 18, 7347 Bad Überkingen, Fed. Rep. of Germany, assignor to Hans Stahlecker and Fritz Stahlecker, both of, Fed. Rep. of Germany

Filed Nov. 4, 1985, Ser. No. 794,408
Claims priority, application Fed. Rep. of Germany, Nov. 8, 1984, 3440816
Int. Cl.[4] D01H *7/892, 7/895, 7/885*
U.S. Cl. 57—412 19 Claims



1. Apparatus for feeding sliver to an opening roller of an open-end spinning machine, comprising:

a feeding roller and a sliver loading means disposed adjacent one another to form a sliver clamping gap therebetween, said feeding roller and sliver loading means being operable to form a fiberbeard of sliver which is fed to the circumference of the opening roller,

fiberbeard support means disposed opposite the circumference of the opening roller for supporting the fiberbeard as it is fed from the sliver clamping gap to the opening roller,

and movable guide support means connected with the fiberbeard support means and being operable to move the fiberbeard support means between an operating position adjacent to the circumference of the opening roller to a cleaning position away from the operating position where the fiberbeard support means is accessible to a cleaning element for cleaning without requiring movement of the opening roller.

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4,590,758

## CHAIN COUPLING LINK

Robert Hannig, Ludwig-Uhland-Str. 6, D-4354 Datteln, and Jürgen Rast, Büscherstr. 65, D-4355 Waltrop, both of Fed. Rep. of Germany

PCT No. PCT/DE83/00008, § 371 Date Aug. 16, 1983, § 102(e) Date Aug. 16, 1983, PCT Pub. No. WO83/02653, PCT Pub. Date Aug. 4, 1983
PCT Filed Jan. 20, 1983, Ser. No. 527,520
Claims priority, application Fed. Rep. of Germany, Jan. 22, 1982, 3201840
Int. Cl.[4] F16G *13/06*
U.S. Cl. 59—85 4 Claims

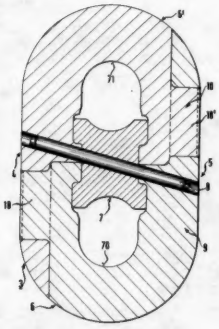
1. A forged chain coupling link device comprising:

two half link members adapted to engage and interlock into each other such that said two half link members form a coupling link having a longitudinal median plane and a middle transverse plane, each one of said two half link members comprising:

a short leg having a machined outer face having a flat surface portion lying in a plane substantially parallel to said longitudinal median plane, said plane of said flat surface portion of said machined outer face and said longitudinal median plane being spaced apart a first predetermined distance; a machined end face lying in a plane coextensive with said middle transverse plane; a first machined inwardly directed face means located between said outer face and said longitudinal median plane; and a pin member

having a machined end face extending from said outer face of said short leg in a direction away from said longitudinal median plane, said pin member having a median plane spaced a third predetermined distance from said middle transverse plane;

a long leg having a machined inwardly turned face having a flat surface portion lying in a plane substantially parallel to said longitudinal median plane and diametrically opposite of said plane of said flat surface portion of said machined outer face of said short leg, said plane of said flat surface portion of said machined inwardly turned face and said longitudinal median plane being spaced apart a second predetermined distance, said second predetermined distance being equal to said first predetermined distance; a machined end face lying in a plane coextensive with said middle transverse plane; a second machined inwardly directed face means located between said inwardly turned face and said longitudinal median plane; and a hollow portion having an axis parallel to said middle transverse



plane, said axis further being spaced a fourth predetermined distance from said middle transverse plane, said fourth predetermined distance being equal to said third predetermined distance;

a rounded end piece having a first end portion integral with said short leg, a second opposite end portion integral with said long leg and a cylindrical central section between said first end portion and said second opposite end portion whereby said short leg, said long leg and said rounded end piece form one of said two half link members;

hardened forged chamfer means located adjacent said machined end face of said pin member, said machined inwardly turned face of said long leg, said machined outer face of said short leg, and said first and second machined inwardly directed face means whereby said hardened forged chamfer means are preserved in an as-forged condition to avoid disturbing the grain structure of the metal after all machining operations are completed; and

means for interlocking said two half link members to each other such as to form a chain coupling link.

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**4,590,759**

## METHOD AND APPARATUS FOR IMPROVING ACCELERATION IN A MULTI-SHAFT GAS TURBINE ENGINE

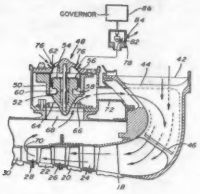
**Cyril A. M. Blizzard, Greenfield Park, Canada, assignor to Pratt & Whitney Canada Inc., Longueuil, Canada**

**Filed Jan. 27, 1984, Ser. No. 574,387**

**Int. Cl.[4] F02C *9/16***

**U.S. Cl. 60—39.03** **1 Claim**

**1.** A method for improving the acceleration of a free turbine, gas turbine engine from a minimum power condition to a maximum power condition, wherein the gas turbine engine is provided with a diaphragm bleed valve means having a first chamber means and a second chamber means defined by a diaphragm, the first valve chamber means communicating with the compressor and a pre-swirl station and operative to permit or block bleed air from the compressor to the bleed air station, a high pressure air source communicating with the second chamber and with a control valve operatively connected to a governor which in turn is connected to load sensing means, including the steps of proportionally supplying bleed air from a compressor of the gas turbine engine to a pre-swirl station as the low load is sensed causing the governor to open the control valve, thus maintaining low pressure in the second chamber



such as to permit the first chamber to be open, whereby a jet flap is created at the pre-swirl station thereby maintaining a constant compressor speed matched with the power turbine loads at low power requirements; sensing an increased load and thus higher power requirements at the output of the gas turbine engine, thus causing the governor to gradually close the control valve and building up the pressure in the second chamber which forces the first chamber to close; and progressively eliminating the pre-swirl as higher power requirements are required.

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**4,590,760**

## MEDIUM-LOAD POWER GENERATING STATION WITH AN INTEGRATED COAL GASIFICATION PLANT

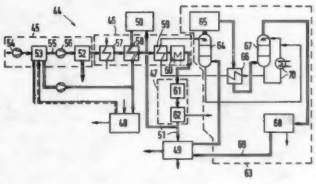
**Konrad Goebel; Rainer Müller, both of Erlangen, and Ulrich Schiffers, Eckental, all of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany**

**Filed May 25, 1984, Ser. No. 614,469**

**Claims priority, application Fed. Rep. of Germany, May 31, 1983, 3319732; Jul. 29, 1983, 3327367**

**Int. Cl.[4] F02C *3/28***

**U.S. Cl. 60—39.12** **7 Claims**



**1.** A medium-load power generating plant with an integrated coal gasification plant comprising

(a) a coal gasification plant for producing raw hot fuel gas-containing carbon monoxide and hydrogen,

(b) a raw gas heat exchanger installation having a first raw gas heat exchanger for indirect heat exchange between the hot raw gas from the coal gasification plant with feedwater to generate steam,

(c) a gas purifier for purifying the raw gas,

(d) a central purified gas distribution system,

(e) a purified gas supply line connected to the raw gas heat exchanger installation and passing into the central purified gas distribution system,

(f) a purified gas continuous-flow interim storage plant connected in parallel to the purified gas supply line,

(g) a gas turbine power generating plant connected to the coal gasification plant to receive fuel via the purified gas supply line,

(h) a methanol synthesis plant having parallel-connected modules for converting CO and $H_2$ into methanol connected to the gas turbine power generating plant via the central purified gas distribution system, the combination therewith of

(i) a cooler-saturator loop connected to a gas line containing carbon monoxide produced in said coal gasification plant and converting it into a gas richer in hydrogen, comprising a saturator wherein the gas is saturated with moisture, a converter wherein at least part of the carbon monoxide in the gas saturated with moisture is converted to hydrogen and carbon dioxide; a cooler for cooling the products from the converter, a gas purification plant for the removal of carbon dioxide and hydrogen sulfide, if any, from the gas from the cooler, and connecting means for passing said purified gas to the methanol synthesis plant for hydrogen enrichment of synthesis gas to be converted into methanol.

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**4,590,761**

## ROTARY COMBUSTION CHAMBER REACTION ENGINE

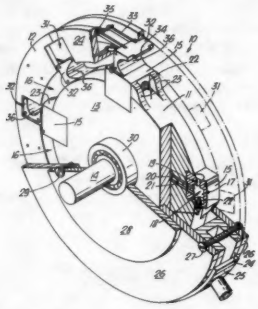
**Michael Zettner, Erlenstrasse 1, 8510, Fürth, Bavaria, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 442,201, Nov. 16, 1982, abandoned. This application Aug. 22, 1984, Ser. No. 643,326**

**Claims priority, application Fed. Rep. of Germany, Nov. 19, 1981, 3145783**

**Int. Cl.[4] F02C *5/04***

**U.S. Cl. 60—39.34** **15 Claims**



**1**. An internal combustion engine comprising a circular inner element and a concentric annular outer element which are disposed so that the inner circumference of said outer element surrounds the outer circumference of said inner element and which are mounted for relative rotation about the axis of concentricity thereof, wherein one of said elements is provided at said circumference thereof with means defining a plurality of recesses equidistantly spaced around said circumference to each serve as an expansion chamber for combustion gas and further defining a corresponding plurality of combustion chambers each disposed at one end of an associated one of the recesses and each having a nozzle portion opening circumferentially into said recess for causing combustion gas from combustion of a combustible substance in the chamber to form a jet entering the associated one of said recesses directed generally towards the other end of the recess, and wherein the other one of said elements is provided with a plurality of equidistantly spaced reciprocating reaction members each movable in a first direction of movement to project radially from said circumference of said other element and into each of said recesses in turn thereby to be so acted on by said combustion gas in each recess that forces acting in opposite sense on said elements are created to effect relative rotation thereof and is further provided with a respective exhaust port within said circumference of said other element for closure by each said reaction member only when movement of the reaction member in said first direction of movement thereof is substantially complete, each said reaction member having deflector surface means for deflecting the gas jet in each said recess out through the respectively associated exhaust port and translating a component of the energy of the deflected jet into a force displaying the reaction member in said first direction of movement thereof until said closure of said exhaust port, and said one element being provided at said other end of each said recess with respective cam means to displace each said reaction member in turn in a second direction of movement thereof opposite to said first direction of movement and thereby out of that recess.

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**4,590,762**

## SECONDARY AIR SUPPLY DEVICE FOR AN INTERNAL COMBUSTION ENGINE EXHAUST SYSTEM

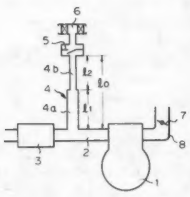
**Ken Mifuji, Aichi, and Norio Shibata, Toyota, both of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan**

**Filed Jul. 10, 1984, Ser. No. 629,496**

**Claims priority, application Japan, Jul. 12, 1983, 58-127433**

**Int. Cl.[4] F01N *3/30***

**U.S. Cl. 60—293** **1 Claim**



**1**. A secondary air supply device for introducing fresh air into exhaust gas flowing through an exhaust pipe of an internal combustion engine in response to pressure pulsations of the exhaust gas, which comprises:

a secondary air supply conduit having first and second ends, said second end being adapted to be connected to the exhaust pipe; and

a check valve mounted at said first end of said secondary air supply conduit for preventing backflow of the exhaust gas out of said first end due to pressure pulsations of the exhaust gas;

said secondary air supply conduit having at said second end a flow cross-sectional area larger than the flow area at said first end,

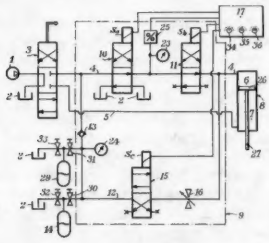
wherein said secondary air supply conduit comprises a stepped tube including at the side of said first end a first section of reduced flow cross-sectional area and at the opposite side a second section of enlarged flow cross-sectional area, and wherein the length of said second section is roughly one-half of the total length of said secondary air supply conduit.

## 4,590,763

## METHOD OF SUPPLYING A NORMALLY CONTINUOUS OPERATING HYDRAULIC ACTUATOR WITH HYDRAULIC FLUID, CONTINUOUSLY AND BY CONTROLLED PULSE, AND A DEVICE FOR IMPLEMENTING SAID METHOD

**Jean-Pierre Augoyard, Domont, and Philippe Guggemos, Courbevoie, both of France, assignors to GTM Entrepose, Nanterre, France**

**Filed Oct. 31, 1984, Ser. No. 666,824**
**Claims priority, application France, Nov. 2, 1983, 83 17382**
**Int. Cl.[4] F15B *1/02***
**U.S. Cl. 60—327** **11 Claims**



2. A device for supplying a normally continuous operating hydraulic actuator with hydraulic fluid, continuously and by controlled pulses, comprising a pump, a fluid reservoir, a first pipe having a first end and a second end connectible to a pressure chamber of a hydraulic actuator, a main distributor valve connected to said pump, to the reservoir and to the first end of said first pipe for causing said first pipe to communicate selectively with said pump or with said reservoir, a first controlled valve which is connected to said first pipe and to said reservoir and which has a rest position, in which said first pipe is isolated from the reservoir, and a working position, in which a communication is established between said first pipe and said reservoir, a second controlled valve which is inserted in said first pipe between the second end thereof and the first controlled valve and which has a rest position, in which fluid is allowed to flow in said first pipe, and a working position, in which said fluid flow is cut off, a second pipe having a first end and a second end which are connected to said first pipe respectively between the main distributor and said second controlled valve and between said second controlled valve and the second end of said first pipe, a first pressure accumulator connected to said second pipe, valve means inserted in said second pipe and including a third controlled valve having a rest position, in which fluid flow in said second pipe from said first accumulator to the second end of said second pipe is cut off, and a working position, in which fluid is allowed to flow from said first accumulator to the second end of the second and first pipes, control means including pressure sensitive means hydraulically connected to said first pipe for giving an indication of the value of the hydraulic pressure prevailing in said first pipe, said control means being connected to the first, second and third controlled valves and being operable, upon an indication by said pressure sensitive means, that the hydraulic pressure in said first pipe has reached a chosen value, for successively actuating, in order, the first, the second and the third controlled valves into their working position and for bringing them back to their rest position.

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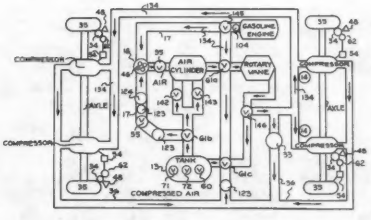
## 4,590,764

## ALL-DIGITAL ELECTRICALLY POWERED SERVO

**Alfonso S. Escobosa, 2034 Brittany Pl., Placentia, Calif. 92670**

**Filed Jan. 22, 1985, Ser. No. 693,531**
**Int. Cl.[4] F15B *9/03***
**U.S. Cl. 60—390** **3 Claims**

1. A completely digital, electrically powered, electrohydraulic servo, the hydraulic actuator of said servo controlled in accordance with a binary reference representing the command position, a binary error derived from the difference of said binary reference and a binary feedback representing the position of the actuator, said binary error limited and converted to a pulse train having a pulse repetition frequency which is proportional to the magnitude of the binary error, each pulse of said pulse train gated by the sign bit of the error binary number to one of two electrohydraulic incrementers through the set input of a corresponding set/reset flip flop, the initiation of the servo drive signal by the change from a low state to a high state of the output of the flip flop as the result of the set pulse, the termination of the servo drive signal by the change from a high state to a low state of said output as the result of a reset pulse, the servo drive signal formed by the set and reset pulses, said drive signal power amplified and applied to the corresponding solenoid of a solenoid driven piston pump, a




pump position indicator set to issue the reset pulse at a point near the full extension of the piston pump; the injection of the displaced incremental volume of fluid through an injection check valve into the corresponding actuator control chamber by the extension of the piston pump, the ejection of said volume through an ejection check valve from the opposite actuator control chamber by the retraction of said piston pump; a volume adjuster connected to the actuator control chambers, said volume adjuster consisting of a free-floating, stepped piston, first and second areas separately connected to the first and second actuator control chambers, respectively, said first and second areas sized proportionally to the piston areas of the actuator facing the first and second control chambers, the opposite side of the volume adjuster charged with compressed gas which sets the operating common mode pressure of the actuator.

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## 4,590,765

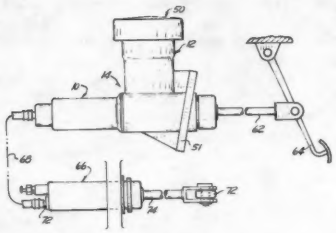
## HYDRAULIC CYLINDER MODULAR STRUCTURE

**Keith V. Leigh-Monstevens, Troy, Mich., assignor to Automotive Products plc, Warwickshire, England**

**Filed Jul. 23, 1984, Ser. No. 633,462**
**Int. Cl.[4] B60T *11/26***
**U.S. Cl. 60—585** **6 Claims**

1. A hydraulic cylinder assembly for a hydraulic apparatus, said hydraulic cylinder assembly consisting of a hydraulic cylinder having a circularly cylindrical housing and a separate detachable and interchangeable tubular member open at both ends and fitted over said cylindrical housing, said cylindrical housing comprising a peripherally recessed portion defining a first annular groove, a peripherally threaded portion disposed on one side of said first groove, an outwardly extending annular abutment shoulder on the other side of said first groove, a first annular seal disposed in a second peripheral groove between said one side of said first groove and said peripherally threaded portion, a second annular seal disposed in a third peripheral groove between said other side of said first groove and said annular abutment shoulder, and at least one port through the wall of said cylindrical housing leading in said first

groove, and said detachable and interchangeable tubular member having a bore comprising a smooth portion engaged with said first and second annular seals, an internally threaded portion mating said externally threaded portion of said cylindrical housing and an end defining an annular face engaged with said



abutment shoulder of said cylindrical housing when said tubular member is threaded over said cylindrical housing, said tubular member having an orifice in its bore for supplying fluid to said first groove and to the interior of said cylinder housing through said port through the wall of said cylindrical housing.

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**4,590,766**

## EXHAUST GAS STEAM TURBINE DRIVE UNIT FOR AUTOMOTIVE VEHICLES

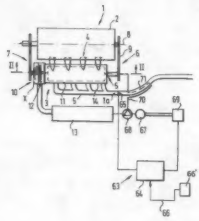
**Helmut Striebich, Karlsruhe, Fed. Rep. of Germany, assignor to Dr. Ing. H.c.F Porsche AG, Fed. Rep. of Germany**

**Filed Jul. 16, 1984, Ser. No. 631,078**

**Claims priority, application Fed. Rep. of Germany, Jul. 27, 1983, 3326992**

**Int. Cl.[4] F01K** *23/10;* **F02G** *5/02*

**U.S. Cl. 60—618** **37 Claims**



1. In a drive unit including an internal combustion engine and a waste heat turbine unit operated by the exhaust gases of the internal combustion engine for utilizing the energy from the exhaust gases,

the waste heat turbine unit comprising a rotatable cylinder member having an exterior and a hollow interior, blading exposed to the exhaust gases and carried on the exterior of the cylinder member, a steam turbine unit, and means for supplying a liquid medium, convertible into steam, to the interior of the cylinder member, the medium being expandable in the steam turbine unit for generating power.

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**4,590,767**

## HOT GAS ENGINE AND VEHICLE DRIVE SYSTEM

**Elmer W. Gardner, Jr., 3359 Alexis Rd., Groesbeck, Ohio 45239**

**Continuation-in-part of Ser. No. 238,587, Feb. 26, 1981, abandoned. This application Feb. 27, 1985, Ser. No. 706,451**

**Int. Cl.[4] F01K** *15/00*

**U.S. Cl. 60—668** **3 Claims**

1. An apparatus for providing auxiliary power and braking to a vehicle including an electric monitoring system for the automatic control of said auxiliary power and braking and for the recovery of kinetic energy comprising:

(a) a vehicle having at least one tire and wheel and a drive shaft;

(b) an engine connected to said vehicle for powering said vehicle and including an electrohydraulic motor, an air cylinder with operatively connected elements and including an output shaft and having a rotary vane connected to said output shaft, said electrohydraulic motor and said air cylinder being operatively connected to said drive shaft of said vehicle;

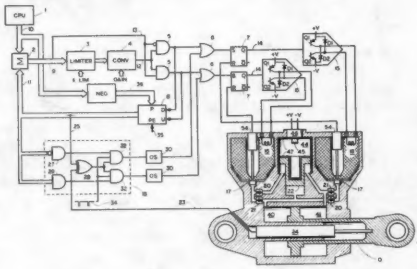
(c) at least one hydraulic pump, at least one compressor and at least one alternator operatively connected to said tire and to said drive shaft of said vehicle and including means for the recovery of kinetic energy;

(d) means for braking said vehicle including means for loading said air cylinder, said rotary vane, said hydraulic pump, said compressor and said alternator and therefore said drive shaft of said vehicle;

(e) a closed circuit circulating system for compressed air and hydraulic fluid and including means for storing said air and said hydraulic fluid;

(f) means for recovering kinetic energy of said vehicle including means for the automatic electric switching of electronic components for regulating and controlling the auxiliary power and the kinetic energy recovery equipment including;

at least one mercury switch for sensing the gradient position of said vehicle,



at least one sensor switch for determining the air pressure in said closed circuit circulating system and in a storage container,

a series of batteries for storing electricity,

a master control switch for automatic or manual control of said monitoring system,

a series of relays and switches and including at least one master relay for the automatic switching of voltage,

a series of resistive electrodes for heating of compressed air,

a DC oscillator for the intermittent switching of series of electric relays,

at least one DC generator connected to said drive shaft for generating direct current that is fed to a potentiometer for variable voltage output,

at least one potentiometer for providing variable voltage to a series of switching relays,

an AC-DC converter for providing voltage to said resistive electrodes,

at least one electric solenoid valve adapted to said closed circuit circulating system for regulating the flow of air therein,

at least one electric solenoid operatively connected to a retractable gear at tire of said vehicle for driving said alternator, said compressor and said hydraulic pump in the recovery of kinetic energy,

a series of electric solenoids operatively connected to a series of clutch mechanisms that are operatively connected to a series of pulleys and belts that are opera-

tively connected to said output shaft and to said drive shaft,

a pressure sensitive switch adapted to the brake pedal of said vehicle for electric switching of monitoring system during braking of said vehicle.

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**4,590,768**

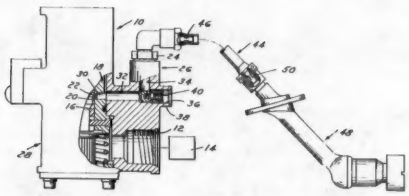
## FUEL DISTRIBUTION VALVE FLOW TRIMMING AND LOCKING MEANS

**Robert M. Halvorsen, Birmingham, and Jeffrey B. Hurst, Troy, both of Mich., assignors to Ex-Cell-O Corporation, Troy, Mich.**

**Continuation of Ser. No. 311,361, Oct. 15, 1981, abandoned. This application Dec. 22, 1983, Ser. No. 564,268**

**Int. Cl.[4] F02C 7/22**

**U.S. Cl. 60—741** **14 Claims**



**1.** In a fuel flow distribution system having a distribution valve with a valve body including an inlet and a plurality of discharge ports each connected to the valve by a fuel flow path, each discharge port connected to a manifold and each manifold being connected to a fuel injector, the improvement comprising: a fuel flow characteristic versus fuel pressure flow trim means for trimming fuel characteristics at each discharge port, said flow trim means including means forming a plurality of passages in the valve body each intersecting a respective fuel flow path, a plurality of axially movable plugs each disposed inside a respective one of said passages with each plug including an outboard end accessible from the exterior of the valve during fuel flow through the system without disassembly of the valve to shift the plug inside each passage to an adjusted position during system fuel flow with said outboard end having a locking portion deflectable against the valve body to lock the adjusted position, and means between each said plug and said valve body for sealing said passage, and trim means on each said plug positionable in the respective fuel flow path to each discharge port to independently vary the fuel flow area to each discharge port in accordance with the position of the respective plug within the respective passage whereby the fuel flow characteristics versus fuel pressure characteristics adjustment can be made for each discharge port from the exterior of valve as total system fuel flow passes through the full system without disassembly of its component parts.

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**4,590,769**

## HIGH-PERFORMANCE BURNER CONSTRUCTION

**Robert P. Lohmann, South Windsor, and Ronald A. Jeroszko, Hebron, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Jan. 12, 1981, Ser. No. 224,406**

**Int. Cl.[4] F02C 3/00**

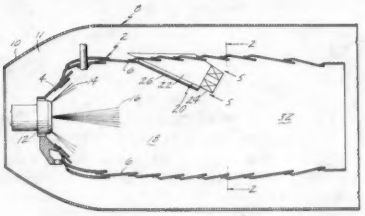
**U.S. Cl. 60—752** **2 Claims**

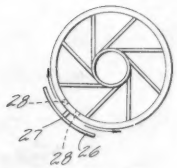
**1.** A burner construction for a gas turbine including:

an end cap having a primary injection nozzle therein;

sidewalls extending downstream from the periphery of the cap;

a row of tubes extending substantially radially inwardly from the sidewalls to a point adjacent the axis of the burner and positioned at an acute angle to the longitudinal axis of the burner, the inner ends of the tubes being spaced from one another to define a clear axial passage centrally of the burner, the tubes being circumferentially spaced from each other to leave an axial passage therebetween, the spacing of adjacent tubes creating lobes for air passage extending outwardly from the axial passage; and





a curved shield on the upstream sides of the tubes and spaced therefrom, said shield defining a space at the edge adjacent the sidewall for the admission of cooling air to the space between the shield and the tube.

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**4,590,770**

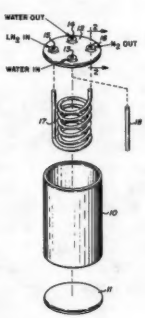
## CRYOGENIC LIQUID HEAT EXCHANGER

**Norman A. Howard, Cupertino, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Jun. 3, 1985, Ser. No. 740,709**

**Int. Cl.[4] F17C 7/02**

**U.S. Cl. 62—52** **7 Claims**




**1.** A self regulating cryogenic liquid evaporator that converts the cryogenic liquid to its gas form at about atmospheric pressure, said evaporator comprising:

a housing chamber for containing a flow of water at a temperature greatly in excess of the cryogenic temperature;

a coil of tubing located inside said housing chamber so as to be immersed in said water and connected at one end to the source of cryogenic liquid wherein said water provides the heat necessary to vaporize said cryogenic liquid;

means for extracting the vaporized cryogenic liquid at the other end of said coil; and

means for extracting cooled water from the top of said housing chamber whereby the back pressure of said vaporized cryogenic liquid in said coil self regulates the entry of cryogenic liquid into said coil.

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**4,590,771**

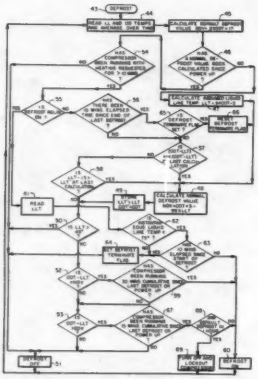
## CONTROL SYSTEM FOR DEFROSTING THE OUTDOOR COIL OF A HEAT PUMP

**Jacob E. Shaffer, York; Wayne D. Dellinger, Windsor, and James R. Harnish, York, all of Pa., assignors to Borg-Warner Corporation, Chicago, Ill.**

**Filed May 22, 1985, Ser. No. 736,899**

**Int. Cl.[4] F25D *21/06***

**U.S. Cl. 62—156** **9 Claims**



1. In a heat pump having a compressor, an indoor coil, and an outdoor coil in thermal communication with outdoor ambient air, and which heat pump may be switched from a heating mode to a defrost mode to defrost the outdoor coil, a defrost control system for the outdoor coil comprising:

a first temperature sensor for sensing the outdoor ambient temperature;

a second temperature sensor for sensing a second temperature which is related to the temperature of the outdoor coil and which is less than the outdoor ambient temperature, the second temperature decreasing as frost accumulates on the outdoor coil;

control means responsive to the two sensed temperatures, under clean frost-free coil conditions, for determining a Normal Defrost Value which is the difference that will later exist between the two sensed temperatures under frosted coil conditions when defrosting will be required;

and defrost means, controlled by said control means, for establishing the heat pump in its defrost mode to defrost the outdoor coil when the second temperature becomes lower than the outdoor ambient temperature by an amount that is greater than the Normal Defrost Value;

said control means effectively ignoring the sensed second temperature, when the defrost control system is initially powered up at which time the amount of frost buildup on the coil is unknown, and employing the sensed outdoor ambient temperature to calculate an assumed value for the second temperature which value is likely to exist during clean frost-free conditions, the first Normal Defrost Value determined after power up thereby being based on the assumed second temperature.

**4,590,772**

## AIR CONDITIONING SYSTEM FOR VEHICLE

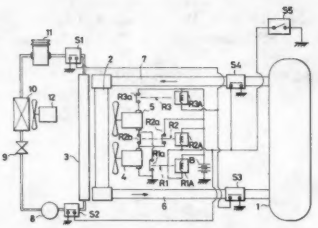
**Toshimitsu Nose, and Toshio Ohashi, both of Atsugi, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Oct. 5, 1984, Ser. No. 657,955**

**Claims priority, application Japan, Oct. 7, 1983, 58-187798**

**Int. Cl.[4] F25B *39/04*; F01P *7/02***

**U.S. Cl. 62—184** **7 Claims**



1. An air-conditioning system for a vehicle configured so as to vary draft volume to the radiator through which engine cooling water is circulated and to a condensor provided in a refrigeration circuit for an air conditioner, in accordance with operating conditions of the engine and an air conditioner, comprising:

a set of motor-fans for air cooling the radiator and the condensor;

a plurality of sensor means for sensing, respectively, the temperature of engine cooling water, the pressure of refrigerant flowing into the condensor, and atmospheric temperature;

an operational mode control means responsive to said plurality of sensor means for alternately establishing one of a plurality of operational modes programmed based on how power is supplied to said plurality motor-fans, thereby enabling fine adjustment of the draft volume to the condensor in order to effect a desired cooling of the engine, said operational modes including a parallel drive mode for parallely providing power to each of said plurality of motor-fans, a serial drive mode for serially providing power to said plurality of motor-fans, a partial drive mode for providing a power to less than all of said plurality of motor-fans, and an OFF mode for disconnecting said plurality of motor-fans from the power source.

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**4,590,773**

## HEAT EXCHANGER FOR REFRIGERATOR

**Akichika Hoshino, Tama, and Youichi Honzi, Nirasaki, both of Japan, assignors to The General Corporation, Kanagawa, Japan**

**Filed Jun. 27, 1984, Ser. No. 624,977**

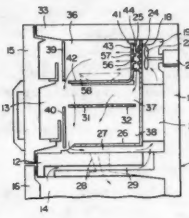
**Claims priority, application Japan, Jun. 30, 1983, 58-101775[U]**

**Int. Cl.[4] F25D *17/00***

**U.S. Cl. 62—333** **9 Claims**

1. A refrigerator of a forcible circulation type in which chilled air from a primary cooler is fed into a freezing chamber through a chilled air outlet provided on the freezing chamber and forcibly circulated in said freezing chamber, the refrigerator comprising: a heat exhanger constituted by a pair of plates bonded by rolling to each other, said plates being made of a material having a high heat conductivity, said heat exchanger having at least a horizontal portion and a riser portion protruding upright from one end of the horizontal portion integrally therewith, a plurality of first refrigerant passages formed between the two plates of sid horizontal portion, a plurality of second refrigerant passages formed between the two plates in said riser portion, and a refrigerant charged so as to be circulated through the first and second refrigerant passages, said

riser portion being disposed to oppose said source of chilled air; and



means for supporting said heat exchanger in the freezing chamber such that said riser portion is opposed to said chilled air outlet.

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**4,590,774**

**ICEMAKER**

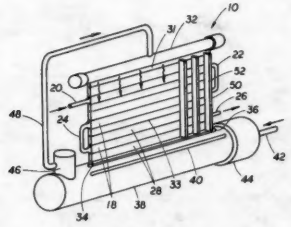
**Walter Povajnuk, 575 Tena Place, Victoria, British Columbia, Canada (V9C 1M6)**

**Filed Jan. 4, 1984, Ser. No. 568,126**

**Claims priority, application Canada, Sep. 6, 1983, 436140**

**Int. Cl.[4] F25C *1/12***

**U.S. Cl. 62—347** **10 Claims**



5. An icemaker comprising:

(a) an assembly of thermally conductive spaced-apart tubes having a pair of substantially opposed ice-forming outer elongated surfaces, said tubes interconnected in fluid communication to permit coolant fluid to pass through each tube in succession, and a thermally non-conductive elongated strip of material along each side edge of each tube, the outer opposed surfaces of each of said strips being continuous with corresponding ice-forming surfaces of associated ones of said tubes, such that the long side edges of opposed strips have a gap therebetween;

(b) a plurality of spacers each extending across elongated ice-forming surfaces of said tubes on one side of said assembly at spaced-apart intervals thereon;

(c) means for releasably holding said spacers against said ice-forming surfaces;

(d) a header located at the upper end of said assembly of tubes and strips for distributing a curtain of water in a pre-selected rate of flow down each side thereof;

(e) a sump for catching excess water flowing down from a bottom of said assembly of tubes and strips;

(f) a float valve for controlling a flow of make up water into said sump;

(g) a pump on said sump for pumping water therefrom into said header.

**4,590,775**

**PRESSURE EARRING**

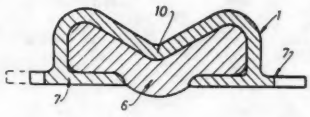
**Jose M. C. Rivaud, Puertaferrisa 22, tienda, Barcelona, Spain**

**Filed Feb. 6, 1985, Ser. No. 698,627**

**Claims priority, application Spain, Jun. 12, 1984, 279.967**

**Int. Cl.[4] A44C *7/00***

**U.S. Cl. 63—14 G** **6 Claims**



1. Pressure earring, comprising a substantially U-shaped supporting member having two legs and a bottom, each of the legs carrying at a free end thereof an adorning trimming portion, each trimming portion being shaped as a half of a perforating object, said portions together forming a representation of a perforating object, the trimming portions projecting towards each other with mutually confronting ends spaced from each other to form an open space therebetween; said bottom, legs and trimming portions being constructed and arranged to pass around the back, sides and part of the front of the ear lap at a location spaced upwardly from the ear lap lower end so that the view of the front of the ear lap at said lower end is obstructed by the earring; and pressing means on said bottom of the supporting member, said pressing means being applicable to the back side of an ear lap once the latter has been introduced inside the U-shaped supporting member, the ear lap being adapted to be forced by said pressing means into said open space so that a front part of the ear lap protrudes through said open space whereby the trimming portions give a viewer a feeling that the trimming portions pierce the ear lap; said pressure earring being made of one piece only.

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**4,590,776**

**CONTROL DEVICE FOR THE SELECTION OF WEFT YARNS IN A WEAVING MACHINE**

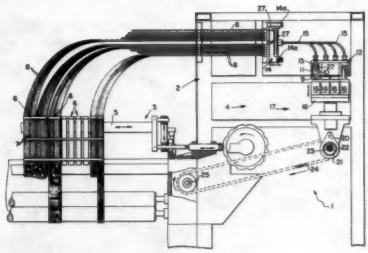
**Antonio Bonaschi, Cilavegna, Italy, assignor to Comez S.p.A., Cilavegna, Italy**

**Filed Dec. 22, 1983, Ser. No. 554,361**

**Claims priority, application Italy, Apr. 28, 1983, 20825 A/83**

**Int. Cl.[4] D04B *23/00***

**U.S. Cl. 66—205** **9 Claims**



1. A control device for the selection of weft yarns in a knitting machine, of the kind in which yarns are supplied to the needles by means of tubular weft yarn guides supported by a crosspiece movable parallelly to a needle-bar, the movement of said tubular weft yarn guides with respect to said cross-piece being controlled by rods moved by tie rods connected in turn to a selective tensionins means for the selection of the same tie rods, characterized in that said selective tensioning means consists of a plurality of movable plates individually integral to said tie rods, and of a plurality of electromagnets individually

facing said plates and globally integral to a movable support approaching said plates and moving away therefrom, provided with an alternate motion in synchronism with the movement of said needle-bar, said electromagnets being individually excited, according to a predetermind work program, by electronic circuits.

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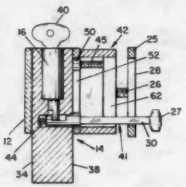
**4,590,777**

## DOORLOCK

**Rafael Sierra, 639 Alamitos Ave., Long Beach, Calif. 90802**

**Filed Oct. 20, 1983, Ser. No. 543,690**
**Int. Cl.[4] E05B *63/12***
**U.S. Cl. 70—104** **18 Claims**




1. A sliding bolt lock comprising:
a housing formed with a bolt passage;
a primary bolt disposed for reciprocation from one position to another position in said passage along said passage;
a keeper formed in said housing:
a secondary bolt carried by said primary bolt and movable relative to said primary bolt into engagement with said keeper in at least one of said positions of said primary bolt; and
a lock carried by said primary bolt and operable to permit such engagement in said one of said positions.

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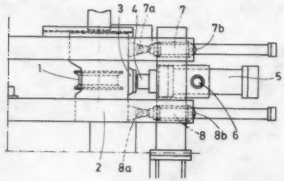
**4,590,778**

## POSITIONING CONTROL DEVICE FOR GUIDANCE FEED MEMBERS AT THE ENTRANCE OF A HOT-ROLLED WIDE STRIP FINISH ROLLING MILL TRAIN

**Jürgen Klöckner, Netphen-Eschenbach, and Dieter Rosenthal, Niederfischbach, both of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag AG, Dusseldorf, Fed. Rep. of Germany**

**Filed Jun. 26, 1985, Ser. No. 749,287**
**Claims priority, application Fed. Rep. of Germany, Jun. 27, 1984, 3423560**
**Int. Cl.[4] B21B *37/08, 39/20***
**U.S. Cl. 72—19** **3 Claims**




1. Positioning control device for guiding the side edges of a strip at the entrance into a hot-rolled wide strip finish rolling mill train having a rolling direction, comprising guidance feed members arranged to guide the opposite side edges of the strip, said guidance feed members being displaceable transversely of the rolling direction, a piston-cylinder assembly in operative engagement with each of said guidance feed members for displacing said feed members transversely of the rolling direction, a position regulation circuit for each said piston-cylinder assembly, first means for continuously supplying measured values of the position of the strip within the finish rolling train as adjustment signals to said position regulation circuits after comparing the actual values with a preset required value for effecting an appropriate displacement of said guidance feed members, wherein the improvement comprises second means for comparing the actual value of the measured upsetting force acting on the strip edge by said guidance feed members in comparison with a predetermined required value for generating a correction-setting signal, and third means for superimposing a pressure regulation on the position regulation so that in dependence upon the correction-setting signal from said first means a displacement of said guide feed members can be effected.

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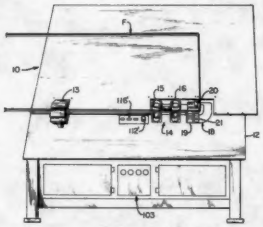
**4,590,779**

## PROGRAM-CONTROLLED FRAME BENDING METHOD AND APPARATUS

**Ronald R. Stange, Littleton; Dennis J. Ekren, Denver, and Gary E. De Martelaere, Conifer, all of Colo., assignors to Tools for Bending, Inc., Denver, Colo.**

**Filed Sep. 18, 1984, Ser. No. 651,989**
**Int. Cl.[4] B21D *43/28***
**U.S. Cl. 72—294** **20 Claims**




1. A frame bending machine for automatically bending a continuous length of tubular stock material of generally rectangular cross-section, said machine comprising:
a platform;
drive means including releasable clamping means engageable with said stock material for advancing said material along a straight guide path on said platform, travel-sensing means associated with said drive means to sense the distance of travel of said stock material along the guide path;
bending die means at one end of said guide path for receiving each leading end of said stock material, said bending die means having a rotatable die member and means for activating said die member to advance it into clamping engagement with said stock material as said die member is rotated through an angle approximating 90° whereby to bend said stock material to a corresponding angle; and
programmable circuit means storing information from said travel-sensing means to activate said drive means at a predetermined rate of speed correlated with the distance of travel of said stock material between said successive bends, said programmable circuit means including means programmed to activate said drive means to successively advance said stock material a predetermined distance between said successive bends, simultaneously release said releasable clamping means and activate said bending die means to form a bend in said stock material, followed by releasing said bending die means and activating said releasable clamping means to advance a predetermined length of material for each next successive bend.

4,590,780

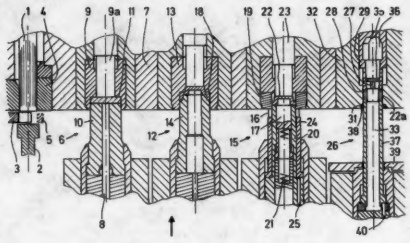
## PROCESS AND APPARATUS FOR PRODUCING AT LEAST TWO FORGINGS ON A HOT-FORMING PRESS

Ernst Bachmann, Ettingen, Switzerland, assignor to Hatebur Umformmaschinen AG, Reinach, Switzerland

Continuation of Ser. No. 433,083, Oct. 6, 1982, abandoned. This application Jan. 2, 1985, Ser. No. 688,264

Int. Cl.[4] B21D *28/06, 53/10*

U.S. Cl. 72—328 2 Claims



1. A process for producing at least two forgings in a multi-stage work cycle on a hot-forming press by means of cooperating punch and die members including the steps of producing a pressed article which has at least two coaxial parts connected to one another by a radially extending annular web, said parts being an inner part and an outer part, of which at least the outer part, having the greater outside diameter, is annular, and the inner part is cup-shaped with a closed end, severing the parts from one another in the region of the annular web by shearing, whereby said severing comprises

serving first the outer part in a first severing-processing state at a predetermined first annular separating interface which cuts through the radial annular web and leaves a remaining radially extending annular web connected to the inner part and then ejecting the outer part as a finished part; whereafter

transporting the inner part having a closed end, including said remaining radial annular web section still attached to it into a second severing-processing stage, in which at said second severing-processing stages comprises:

punching out the centrally located closed end of the inner part to form a hollow annular inner part and ejecting the closed end as a waste piece, severing the remaining radial annular web section from the inner part at a predetermined second annular separating interface which cuts through the web section, by contacting the entire face which defines the remaining radially extending annular web section with a corresponding annular supporting surface provided at the front of a die member as the remaining radial annular web is severed therefrom to form a cut-off web, and

moving said punch along a direction of travel to eject the cut-off web section separately from the hollow annular inner part and further eject the annular inner part along said direction of travel of the punch member.

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4,590,781

## METHOD FOR FORMING AN ELECTRIC RESISTANCE WELDED STEEL PIPE

Takaaki Toyooka, Chiba, Japan, assignor to Kawasaki Steel Corporation, Hyogo, Japan

Filed Jul. 12, 1984, Ser. No. 630,000

Claims priority, application Japan, Jul. 21, 1983, 58-131398

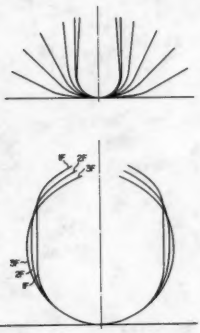
Int. Cl.[4] B21D *5/12*

U.S. Cl. 72—181 6 Claims

1. A method for forming a skelp in the preparation of an electric resistance welded steel pipe by successively forming said skelp into a rounded, tubular form and leading said rounded skelp to fin pass rolls to effect a finishing work followed by welding together oppositely facing peripheries of marginal end portions of said rounded skelp which comprises the steps of:

(a) bending a skelp by roll forming a region along a centerline of said skelp into a U-shaped flower pattern leaving both side portions of said skelp unbent by the use of holding rolls for successively holding and restraining said marginal edge portions and a plurality of center-bend rolls for restraining and forming said skelp in said centerline region;

(b) forming said edge portions of said bent skelp by bending to give a curvature of at least 80% of a final curvature of a finished pipe while said side portions are restrained from bending by means of upstream-side fin pass rolls and simultaneously forming over-bent portions, each having a



curvature larger than said final curvature of said finished pipe along boundary regions between said side portion and edge portion and between said side portion and bottom portion of said rounded skelp; and

(c) forming said side portions of said rounded skelp, which have been restrained from bending in step (b) to successively bulge-out in a transverse direction to increase a transverse diameter by decreasing a vertical diameter of said rounded skelp, whereby said bulge-out has forming effects of bending of said side portions and unbending of said over-bent portions formed in step (b) along said boundary regions between said side portions and edge portion and between said side portion and bottom portion of said rounded skelp.

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4,590,782

## MAKING OF A BEVEL GEAR

Herbert Leykamm, Lauf, and Siegfried Knabel, Nuremberg, both of Fed. Rep. of Germany, assignors to Kabel- und Metallwerke G. AG, Hanover, Fed. Rep. of Germany

Filed Jul. 3, 1980, Ser. No. 165,797

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1979, 2927135

Int. Cl.[4] B21K *1/30*

U.S. Cl. 72—354 5 Claims

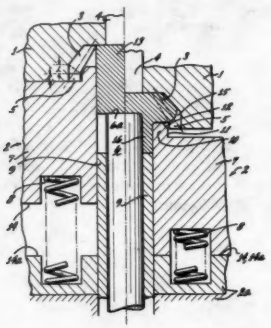
1. Apparatus for making bevel gear, comprising:

a die having a cavity for forming a bevel gear;

a punch disposed for relative advance to and into the die cavity;

a first counterpunch coaxially disposed to the punch and having an annular extension into the cavity, there being a gap between the first counterpunch and the punch, said extension including a cylindrical part, being slightly smaller than any radially adjacent innermost diameter

dimension of the die cavity for a disposition of abutment of the first counterpunch and the die; and



a second counterpunch disposed in said gap being movable in relation to the punch, but also advancing with the punch.

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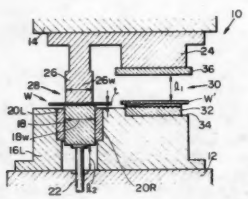
**4,590,783**

## PRESS FORMING PROCESS AND APPARATUS THEREFOR

**Hiroshi Tanaka, Fujisawa; Sotozi Mitani, Sagamihara, and Yasushi Sakurai, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Jan. 23, 1985, Ser. No. 693,986**
**Claims priority, application Japan, Jan. 25, 1984, 59-10245**
**Int. Cl.[4] B21D *17/02***
**U.S. Cl. 72—384** **9 Claims**



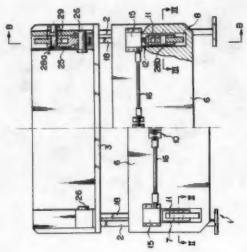
1. A press forming process for producing curved elongate channel-shaped articles, said process comprising the step of simultaneously performing a single pressing movement to effect a wrinkle removal step and a bending step by using a single upper press element of a press forming apparatus, said wrinkle removing step removing wrinkles formed on a surface of a first curved elongate flat sheet metal workpiece which is prepared by an edge bending process in which the wrinkles are formed, and said bending step bending a second wrinkle-free curved elongate sheet metal workpiece which has been previously subjected to said wrinkle removal step, to obtain the curved elongate channel-shaped article.

**4,590,784**

## PRESS BRAKE

**Jiro Okabe; Shunji Fujie, both of Yokohama, and Haruki Takeuchi, Odawara, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 8, 1985, Ser. No. 753,013**
**Claims priority, application Japan, Jul. 27, 1984, 59-156886; Oct. 15, 1984, 59-215727**
**Int. Cl.[4] B21D *5/01***
**U.S. Cl. 72—389** **10 Claims**



1. A press brake, comprising:

a press brake body havinag a die mounted on a press cradle across a pair of left and right frames;

a ram, oblong in shape, having a die, and provided transversely acaross both ends of said frames, and guided up and down by vertical guides on the front of both said frames, and a drive device for driving said ram up and down in relation to said press cradle;

a pair of left and right rotary links attached at one end to said press cradle by pins;

a pair of left and right hydraulic cylinders, rotatably provided on said press cradle, for moving said rotary links from a rear position of the distal ends of said rotary links to the forward position in a fixed arc; and

a pair of left and right beams connected at one end to the left and right ends of said ram by pins and at the other end to the distal ends of said rotary links by pins, said ram being supported in a position nearest said presss cradle when the distal ends of said rotary links are in the forward rotation position, and being supported in a position furthest from the press cradle when said rotary links are in the rear rotation position.

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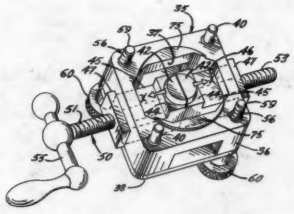
**4,590,785**

## METHOD AND APPARATUS FOR FLARING A TUBE

**John P. Morris, Lockport, Ill., assignor to Andrew Corporation, Orland Park, Ill.**

**Filed Mar. 2, 1984, Ser. No. 585,827**
**Int. Cl.[4] B21D *41/02***
**U.S. Cl. 72—392** **10 Claims**



1. A tool for forming an external flare on the end of a corrugated elliptical waveguide having major and minor transverse

axes, said tool comprising a body, means for detachably fastening said body to said waveguide, a pair of lugs sized and shaped to telescope at least partially into the end of said waveguide when said lugs are in collapsed positions, a pair of mounting members carrying said lugs within said body, means guiding said pair of mounting members for limiting sliding movement relative to said body along one of the transverse axes of said waveguide, drive means connected to both of said mounting members for moving said mounting members, and thus said lugs, toward and away from each other along said one axis within said body without restricting said sliding movement of said pair of mounting members, whereby said mounting members are free to slide, in unison, relative to said body along said one axis while said mounting members are being moved toward and away from each other along that axis, said drive means being attached to said mounting members for movement therewith along said one axis relative to said body, said lugs forming said flare as said lugs move toward said expanded positions.

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**4,590,786**

## CABLE SHOE TONGS WITH A STOP MEANS

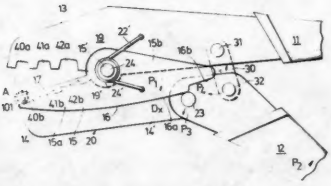
**Hans Wiener, Täby, and Hans Undin, Åkersberga, both of Sweden, assignors to C. A. Weidmüller GmbH & Co., Detmold, Fed. Rep. of Germany**

**Filed Apr. 11, 1984, Ser. No. 599,236**

**Claims priority, application Sweden, Apr. 19, 1983, 8302186**

**Int. Cl.⁴ B21D** *7/06, 53/36*

**U.S. Cl. 72—410** **17 Claims**



**1**. A pair of tongs for crimping cable shoes which have a contact portion and an affixing portion open towards the contact portion, the pair of tongs comprising a pair of handles; a pair of jaws provided with a plurality of die elements and operable by said handles, a first handle united with a first jaw into a rigid, elongated tool body to which the second jaw is operably pivoted in a pivot point, said second jaw having a rear extension extending beyond said pivot point and to which extension the second handle is pivotally attached; a stop means adjacent at least one die element for securing the position of a cable shoe placed in the pair of tongs, wherein said stop means is an elongated rocker bracket extending in the longitudinal direction of the tool body parallel therewith and defining a two-armed lever pivoted in the region of said pivot point to one side face of the tool body and having a forward arm portion extending from the place of pivotal attachment towards the front end of the pair of jaws and comprising an abutment edge adjacent said at least one die element in one jaw, and a rear arm portion extending from the place of pivotal attachment toward the handles and being provided with an engagement means for a first actuating means arranged on said extension; a second actuating means for engagement, in the last phase of a crimping operation, with an engagement means on the rocker bracket; the forward arm portion, upon engagement of the first actuating means with its associated engagement means, positioned close to at least one die element so as to define said stop means for the affixing portion of a cable shoe inserted in the respective die element and allowing the contact portion of the cable shoe to pass therebeyond, and said forward arm portion swinging away from the region of the die elements upon engagement of the second actuating means with an associated engagement means; and a spring means constantly urging the rocker bracket into engagement with one actuating means, wherein the first actuating means is defined by a projecting portion of a pin by which the pivoted jaw is connected to the second handle.

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**4,590,787**

## SCREW PRESS

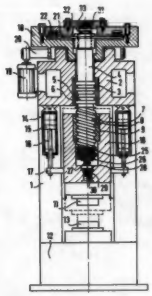
**Hermann-Josef Trimborn, Monheim, Fed. Rep. of Germany, assignor to SMS Hasenclever Maxchinenfabrik GmbH, Dusseldorf, Fed. Rep. of Germany**

**Filed Jul. 9, 1985, Ser. No. 753,166**

**Claims priority, application Fed. Rep. of Germany, Jul. 10, 1984, 3425332**

**Int. Cl.⁴ B21D** *22/00*

**U.S. Cl. 72—454** **9 Claims**



**1**. A screw press comprising a press frame, a slide which is vertically movable in the press frame and supports the upper die, a threaded main spindle operative between the press frame and the slide, a driven disc flywheel and a clutch disc which is connected rotationally rigidly to the main spindle and is connectable by friction contact to the flywheel for the operating stroke of the slide, piston-cylinder units acting between the press frame and the slide for returning the slide to the starting position, first and second spring columns between which the main spindle is axially clamped, the first spring column acting between one end of the main spindle and the slide, the second spring column acting between the other end of the main spindle and a counter thrust bearing axially fixed in the press frame, and an auxiliary spindle of approximately the same lead as the main spindle but with a smaller diameter, which engages in an internally threaded bore in the main spindle and is disposed between the corresponding end of the main spindle and the corresponding spring column in order to compensate the relative axial movement between the axially fixed main spindle and the axially movable slide or between the main spindle axially movable with the slide and the counter thrust bearing held axially movably but rotationally rigidly in the slide or on the counter thrust bearing against the force exerted upon it by the spring column.

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**4,590,788**

## DIE CLAMP

**Bernard J. Wallis, 25315 Kean Ave., Dearborn, Mich. 48124**

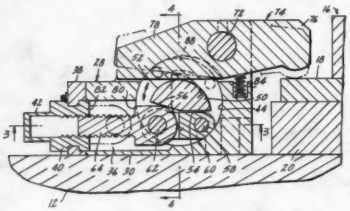
**Filed Oct. 4, 1984, Ser. No. 657,597**

**Int. Cl.⁴ B21D** *37/04*

**U.S. Cl. 72—481** **15 Claims**

**1**. A die clamp comprising a body, a rotatable cam journalled in said body and having an arcuate cam face, a clamping lever pivotally supported intermediate its ends for rocking movement on said body, said lever having one end portion overhanging one end of said body for clamping against a die, the opposite end portion of the lever engaging said cam face so that when the cam is rotated in one direction said lever is

rocked to the die-clamping position, a link having a pivot connection at one end with said cam at an axis fixed on the cam and spaced from and parallel to the axis on which the cam is journalled, a nut member and a screw member, one of said



members being axially fixed and journalled for rotation on said body about an axis perpendicular to the axis on which the cam is journalled, the other member being in threaded telescopic engagement with said one member and being pivotally connected to the other end of said link.

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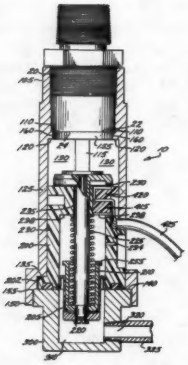
**4,590,789**

## REMOTE CALIBRATOR

**Manfred C. Kunze, 8401 Tradewind Cr., Huntington Beach, Calif. 92646**

**Filed Aug. 31, 1984, Ser. No. 646,634**
**Int. Cl.[4] G01C *25/00***
**U.S. Cl. 73—1 G** **25 Claims**



1. A remote calibrator device for a gas sensing device wherein the sensing device includes a port for communication with the gas to be sensed, comprising:

housing means having a receiving end for communication with the port of the gas sensing device and an open end, said housing means having openings formed therein proximate said receiving end for communicating ambient gas to said gas sensing port;

means for providing a calibration gas chamber, said means comprising a flexible diaphragm responsive to the gas pressure in the chamber so as to move from an initial position toward the receiving end of the housing as the pressure increases;

a movable valve member coupled to the diaphragm and arranged to extend into said open end of the housing, said valve member adapted for movement from said initial position toward said receiving end to substantially obstruct the communication of ambient gas with the port of the gas sensing device when in an extended position;

a spring member cooperatively arranged with said diaphragm and said valve member for biasing said diaphragm and said valve to said initial position;

a body member for supporting said diaphragm means and said valve member, said body member including means for constraining the movement of said valve along an axis extending toward the port of the gas sensing device;

gas inlet means for communicating calibration gas into the gas chamber; and

means for conducting the calibration gas from the gas chamber through said valve member to the port of the gas sensing device when the valve is in the extended position.

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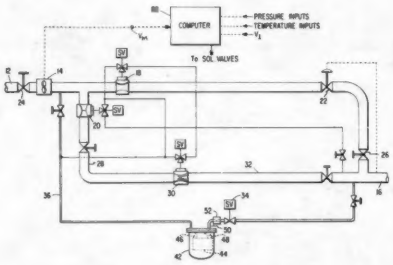
**4,590,790**

## METHOD FOR DETERMINING THE ACCURACY OF A GAS MEASUREMENT INSTRUMENT

**Irwin A. Hicks, Radnor; Robert S. Jacobsen, Hatboro; David F. Kee, Glenside, and George W. Schneider, Jr., Huntingdon Valley, all of Pa., assignors to American Meter Company, Philadelphia, Pa.**

**Filed May 16, 1985, Ser. No. 734,934**
**Int. Cl.[4] G01F *25/00***
**U.S. Cl. 73—3** **1 Claim**




1. A method for determining the accuracy of a gas measurement instrument in a high pressure pipeline, comprising the steps of:

(a) providing a first critical flow device in series with said instrument;

(b) determining for a second, smaller, critical flow device its coefficient of discharge-throat area factor ($C_{ds}A_{ts}$) using a known gas and a Bell prover where

$$C_{ds}A_{ts} = \frac{V_b}{t} \frac{P_b}{P_{ns}} \frac{T_{ns}}{T_b} \frac{1}{Z_b C^* \sqrt{RT_{ns}}}$$

and $Z_bC^*\sqrt{R}$ is a known quantity for said known gas;

(c) determining the factor $C_1{}^*Z_1\sqrt{R_1}$ for the gas in said pipeline by the steps of:

(c1) providing a bypass line from said pipeline;

(c2) providing a meter in said bypass line;

(c3) installing said second critical flow device in said bypass line immediately downstream from said meter;

(c4) measuring the volume of gas ($V_1$) passing through said meter in a given times ($t_2$); and

(c5) calculating

$$C_1{}^* Z_1 \sqrt{R_1} = \frac{V_1}{C_{ds}A_{ts}t_2\sqrt{T_{s2}}};$$

(d) measuring the volume ($V_m$) through said instrument during a predetermined time (t) with a meter pressure ($P_m$) and temperature ($T_m$) and a first device pressure ($P_n$) and temperature ($T_n$); and

(e) calculating the percent accuracy of said instrument as

$$\% \text{ accuracy} = \frac{V_m}{t} \frac{P_m}{P_n} \frac{T_n}{T_m} \frac{C_{ds} A_{ts} t_2 \sqrt{T_{ns}}}{C_d A_t \sqrt{T_n} V_1} \times 100.$$

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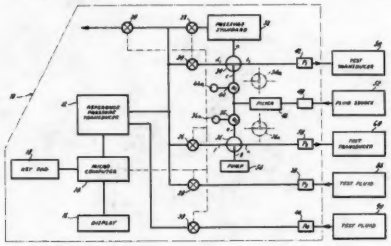
**4,590,791**

## SELF CALIBRATING PRESSURE TRANSDUCER

**Charles J. Reed, Palm Harbor, and Henry R. Heit, Clearwater, both of Fla., assignors to Ametek, Inc., New York, N.Y.**

**Filed Oct. 21, 1983, Ser. No. 544,386**
**Int. Cl.[4] G01L *27/00***
**U.S. Cl. 73—4 R** **2 Claims**



1. A system for determining the accuracy of pressure transducers under test, including a fluid port adapted to be coupled to a transducer under test, a source of accurately controlled fluid pressure, reference pressure transducer means including a microcomputer and a reference pressure transducer for producing an output signal representative of fluid pressure, means for coupling said output signal to said microcomputer to automatically correct the output signal from the reference pressure transducer, control means coupled to and under the control of said microcomputer for selectively coupling said reference pressure transducer means to said source of accurately controlled fluid pressure to said test transducer and to atmospheric pressure, and means for applying a source of fluid pressure selectively to said test transducer and said reference pressure transducer to determine the accuracy of the test transducer, said microcomputer including means for selectively adjusting the local gravity of said source of accurately controlled fluid pressure.

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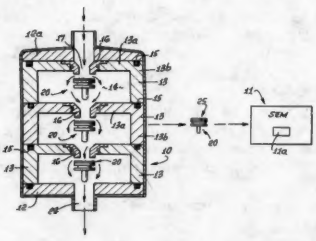
**4,590,792**

## MICROANALYSIS PARTICLE SAMPLER

**William W. Chiang, 305 W. Orange Grove Ave., Sierra Madre, Calif. 91024**

**Filed Nov. 5, 1984, Ser. No. 668,006**
**Int. Cl.[4] G01N *15/02***
**U.S. Cl. 73—28** **21 Claims**




1. In apparatus enabling gas entrained particulate collection and transfer of collected particulate into position for analysis by a scanning electron microscope, the improvement comprising

(a) structure forming a cavity and including a nozzle having an orifice for directing flow of said gas and particulates entrained therein toward the cavity, said orifice having a cross dimension less than about 0.1 inch,

(b) and a holder mounted in the cavity in association with said structure and having an electrically conductive surface facing toward said orifice in the path of flow and normal to the path of flow from the orifice so that particulates collect on the holder proximate said surface,

(c) the holder sized and adapted for use in the scanning electron microscope whereby the holder may be directly transferred to said microscope for electron beam scanning of said particulate,

(d) the holder surface consisting of a low molecular weight substance, and the holder having a body consisting of electrically conductive metal or metal alloy.

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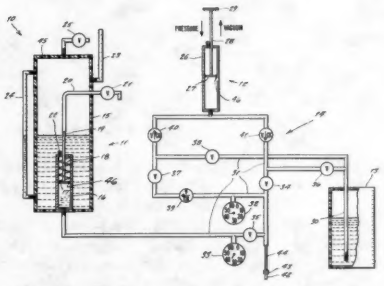
**4,590,793**

## PRESSURE PUMP WITH VOLUMETRIC LEAK RATE DETECTOR

**William L. Staats, Jr., 52 Knox Ave., Berwyn, Pa. 19312**

**Filed Jun. 18, 1984, Ser. No. 621,375**
**Int. Cl.[4] G01M *3/26***
**U.S. Cl. 73—40** **3 Claims**



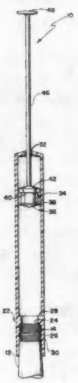
1. A pressure pump with volumetric leak rate detector, comprising, in combination, a level testing unit, a pressure vacuum pump and a safety can connected together by a piping system, and said piping system including means for connection to an underground installed piping system; said level testing unit comprising a tank, a hydraulic cylinder mounted inside a lower end of said tank, a spring biased piston inside said cylinder forming a lower and an upper chamber in said cylinder, a first pipe of said piping system communicating with said lower chamber, said upper chamber freely communicating with an interior of said tank, a piston rod of said piston being tubular and connected to a flexible hose extending outwardly of said tank for exterior communication of said lower chamber, a vent valve on said hose and a vent valve on said tank, and said tank having a lower sight glass for reading a fluid level inside said tank; a second pipe of said piping system being connected to said pressure vacuum pump; and a third pipe of said piping system being connected to said safety can; and said piping system including a plurality of guages, and a plurality of valves and check valves for selective communication between said level testing unit, said pressure vacuum pump, said can and said underground installed piping system.

4,590,794

## LEAK DETECTOR FOR PNEUMATIC TIRE VALVE CORE

Thomas J. Liebl, R.R 1, Box 49, Donnelly, Minn. 56235

Filed Mar. 28, 1985, Ser. No. 717,076
Int. Cl.[4] G01M *3/04*
U.S. Cl. 73—48 5 Claims



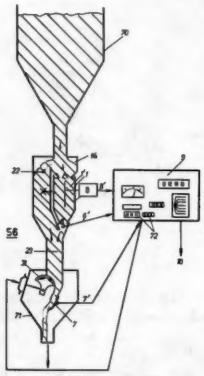
1. An apparatus for detecting fluid leakage from a normally fluid tight valve stem core of a pneumatic tire of the like, said valve stem core haivng a stem with a generally cylindircal stem outer surface, said stem outer surface having a threaded upper poriton and an unthreaded lower portion, said apparatus comprising an elongated, generally tubular body having an internal cavity with a generally cylindrical cavity sidewall, an end wall at one end thereof, and means at the opposed end of said body for detachably, operably coupling said body to said stem, said coupling means including an internally threaded collar for matingly receiving said stem outer surface threaded upper portion and a generally tubular apron extending downwardly from said threaded collar for matingly receiving said stem outer surface lower portion in substantially fluid tight relationship for substantially leakage free fluid communication between said core and said cavity, unbiased piston means interposed between said coupling means and said end wall within said cavity, said piston means including a body portion of given axial length and a wiper rim having an axial length substantially less than said axial length of said body portion extending radially outwardly from said body portion, said wiper rim contacting said cavity sidewall in substantially fluid tight relationship and said body portion being spaced apart from said cavity sidewall, said piston means defining an expandable, fluid tight chamber within said cavity between said coupling means and said piston means, said piston means shiftable between a set position wherein said piston means abut said coupling means and a fully actuated position wherein said piston abuts said end wall, and indicator means operably connected to said piston means for visually indicating the position of said piston within said cavity.

4,590,795

## PROCESS AND DEVICE FOR CONTINUOUSLY DETERMINING THE MOISTURE CONTENT OF SPOILABLE FOODSTUFFS

Hans Oetiker, St. Gallen, and Emanuel Kummer, Gossau, both of Switzerland, assignors to Gerbruder Buhler AG, Switzerland

Division of Ser. No. 392,137, Jun. 25, 1982, which is a continuation-in-part of Ser. No. 355,596, Feb. 17, 1982. This application Dec. 2, 1983, Ser. No. 557,612
Claims priority, application European Pat. Off., Jun. 30, 1981, 81105064.0
Int. Cl.[4] G01N *27/22*
U.S. Cl. 73—73 20 Claims



1. Apparatus for continuously determining the moisture content of a product transported as a product stream, said product stream varying in moisture content along said stream, at least in part, passing through a measurement housing, said apparatus comprising means in said measurement housing for receiving said product stream and extracting a portion thereof, capacitive means in said measurement housing for continuously receiving said portion of said product stream, said capacitive means including a measuring section of a selected length wherein the moisture content of said portion is continuously measured as it passes through the measuring section and means controlling the relative flow rates of said portion within said capacitive means and the remainder of said product stream for accumulating enough of said portion along said measuring section length to permit determination of a pourable average of said product stream within said capacitive means.

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4,590,796

## APPARATUS AND METHOD FOR PULSATION DAMPING AND FLOW MEASUREMENT IN LIQUID FUEL SYSTEM

Wilfried Baatz, Bellevue, Wash., assignor to FloScan Instrument Co., Inc., Seattle, Wash.

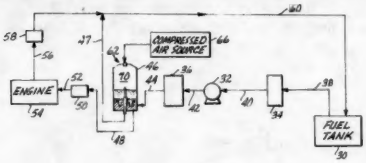
Filed Jan. 23, 1985, Ser. No. 693,875
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—113 25 Claims

1. An apparatus for reducing flow pulsations in a fuel system for a liquid fuel engine, the fuel system comprising a fuel tank and a pump for causing fuel to flow through a fuel flow path from the fuel tank through the pump to the engine, the apparatus comprising:

gas inlet means for introducing gas into the fuel flow path; and

damping means located in the fuel flow path between the pump and the engine for damping flow pulsations in the fuel, the damping means including means for containing a volume of gas in communication with the fuel flowing

through the damping means such that flow pulsations in the fuel are transmitted to and damped by the gas, and separation means for automatically removing gas from the damping means at approximately the same rate as the gas




is introduced by the gas inlet means, such that said volume of gas is substantially constant over time and such that the fuel flowing from the damping means towards the engine is substantially free of gas.

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4,590,797

## THERMAL SYSTEM FOR MEASURING LIQUID LEVELS

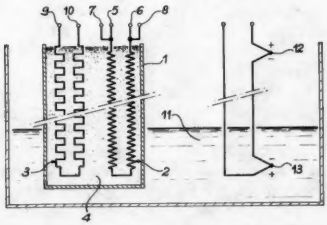
**Jean Beaubatie, Jouy en Josas; Francois Cavarec, Verrieres le Buisson; Jean-Francois Lenclos, Louveciennes, and Marc Paris, Bezons, all of France, assignors to Commissariat a l'Energie Atomique and Framatome & Cie, both of Paris, France**

**Filed Sep. 24, 1984, Ser. No. 653,454**

**Claims priority, application France, Sep. 29, 1983, 83 15562**

**Int. Cl.[4] G01F *23/22***

**U.S. Cl. 73—295** **6 Claims**



**1.** A thermal system for measuring a liquid level comprising a heat sensor with a measuring resistor **(2)** and a sheathed **(1)** heating resistor **(3)**, said heating resistor receiving a pulsed power input, wherein the temperature variation of said heat sensor during the immersion of said heat sensor in liquid **(11)** is used for determining said liquid level, characterized in that it comprises a matching circuit **(18)** measuring the voltage at terminals **(7, 8)** of the measuring resistor **(2)**, the measuring resistor being supplied by a constant current supply **(17)**, the output of said matching circuit being connected in parallel to an input of each of two filters **(20, 22)** for respectively extracting a d.c. component and an a.c. component of the measuring signal, the measuring signal being at the same frequency as said pulsed power input, a computing module **(29)**, in which the value of the level of the liquid and its temperature are determined on the basis of output signals from filters **(20, 22)** and a signal supplied by a means for measuring the variation of the temperatures of the liquid and gaseous medium above the liquid, said computing module **(29)** producing a liquid level signal on the basis of the first derivative with respect to time of the a.c. component of the measuring signal.

4,590,798

## APPARATUS FOR DETECTING OIL LEVEL IN OIL TANK OF SMALL-SIZED MARINE CRAFT

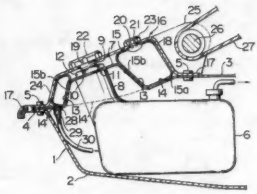
**Mitsuhiro Yazaki, Kakogawa, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan**

**Filed Dec. 27, 1984, Ser. No. 686,687**

**Claims priority, application Japan, Dec. 28, 1983, 58-202320[U]**

**Int. Cl.[4] G01F *23/02***

**U.S. Cl. 73—323** **8 Claims**



**1.** In a marine craft including a body defined by walls and a fuel tank and an oil tank located within the body, an aid to determining the level of oil in the oil tank, comprising:

said oil tank having an oil inlet projecting through one of the walls in the marine craft and positioned adjacent said fuel tank;

said fuel tank having a fuel inlet projecting through said one of said walls so that said fuel inlet is visible from a location outside of said body; and

an oil tank detecting means arranged adjacent to said fuel inlet and including viewing means in said one of the walls of said marine craft so as to be visible from the outside of said body.

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4,590,799

## PIPELINE PIG TRACKING

**Robert C. Brown, Ratho, and John D. McIntyre, Musselburgh, both of Scotland, assignors to British Gas Corporation, London, England**

**Filed Mar. 19, 1984, Ser. No. 590,764**

**Claims priority, application United Kingdom, Mar. 23, 1983, 8307985**

**Int. Cl.[4] G01M *7/00***

**U.S. Cl. 73—432 R** **8 Claims**

**1.** A method for tracking the movement of a pig along a length of pipeline from a first point to a second point spaced a substantial distance from the first point, the length of pipeline containing a number of internal features which are spaced along the length of pipeline at known locations between the first and second points and with which the pig sequentially makes an impact during the movement of the pig along the pipeline so as to generate a series of vibrational signals which correspond to the individual impacts and which are transmitted along the length of pipeline to the second point, the method comprising coupling to the wall of the pipeline at the second point a sensor for sensing the presence of any vibrational signal transmitted along the pipeline to the second point and producing an electrical output proportional to the respective vibrational signal, sensing a said vibrational signal and producing a corresponding said electrical output, and correlating the output produced with the respective internal feature with which the pig has made impact so as to estimate the position of the pig within the length of pipeline at any time.

4,590,800

## SPECIFIC GRAVITY INDICATOR

Keitaro Shimoda, Kusatsu, Japan, assignor to Nissho Corporation, Osaka, Japan

Filed Sep. 24, 1984, Ser. No. 653,739
Claims priority, application Japan, Sep. 22, 1983, 58-175870
Int. Cl.[4] G01N *9/10*
U.S. Cl. 73—449 6 Claims

1. A specific gravity indicator used for measuring the specific gravity of an aqueous liquid, such as urine, which is a shaped article comprising a homogeneous mixture of a styrene homopolymer and a styrene-butadiene elastomer, having a specific gravity of 1.005 to 1.035, the ratio of the styrene homopolymer to the styrene-butadiene elastomer being from 45/55 to 85/15 by weight, the coefficient of thermal expansion of the shaped article being substantially the same as that of the aqueous liquid to be tested within the temperature range of 10° to 30° C.

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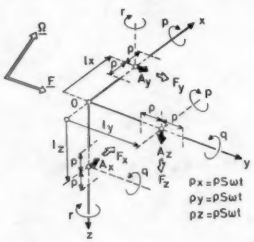
4,590,801

## APPARATUS FOR MEASURING INERTIAL SPECIFIC FORCE AND ANGULAR RATE OF A MOVING BODY

Shmuel J. Merhav, Haifa, Israel, assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Continuation of Ser. No. 528,776, Sep. 2, 1983, abandoned, which is a continuation-in-part of Ser. No. 357,715, Mar. 12, 1982, abandoned. This application May 28, 1985, Ser. No. 737,919
Int. Cl.[4] G01P *15/08, 9/04*
U.S. Cl. 73—510 62 Claims




1. Apparatus for measuring the specific force and angular rate of a moving body, by means of a plurality of accelerometers mounted on mutually perpendicular axes and cyclically driven by drive means in mutually perpendicular planes to produce output signals comprised of the specific force and angular rate, characterized in that:

each accelerometer defines a force-sensing axis and a mass, each accelerometer is mounted for vibratory movement along a first vibration axis which is substantially perpendicular to its force sensing axis in its respective plane;

each accelerometer is vibrated by said drive means along its first axis;

each accelerometer is joined to a counterbalancing mass for counterbalancing the mass of the accelerometer; and

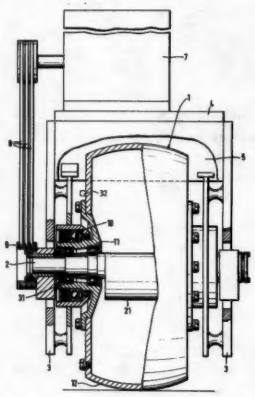
each accelerometer is connected to processor means for generating, from the output of the accelerometer and the angular rate "ω" of vibration of the accelerometer, the specific force and angular rate vector of the moving body using the function "sgn cos ω".

4,590,802

## MEASURING APPARATUS FOR MEASURING THE DEGREE OF COMPACTION OF A MATERIAL

Walery Furmanski, Lyckeby, Sweden, assignor to Dynapac AB, Solna, Sweden

Filed May 8, 1985, Ser. No. 731,727
Claims priority, application Sweden, May 8, 1984, 8402473
Int. Cl.[4] G01M *7/00*
U.S. Cl. 73—573 5 Claims



1. A measuring apparatus for measuring the degree of compaction of the ground or base material used in the building of roads, dams or similar structures, the apparatus comprising:

a chassis frame;

a drum rotatably mounted on said frame and defining a rotational axis about which said drum rotates as the apparatus is pulled over the ground or base material;

eccentrically-loaded shaft means mounted on said frame and mechanically connected to said drum for imparting vibratory movement thereto;

transducer means mounted on said apparatus for generating signals as said drum rolls over the surface of the ground or base material for which the degree of compaction is to be determined; and,

said drum having a profile in a plane passing through said rotational axis, said drum being configured so as to cause said profile to have a shape for which the smallest possible portion of said profile is in contact engagement with the ground as said drum rolls thereover thereby permitting the signals delivered by said transducer means to provide an accurate indication of the degree of compaction of the ground or base materkal.

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4,590,803

## ACOUSTIC WAVEGUIDE MONITORING

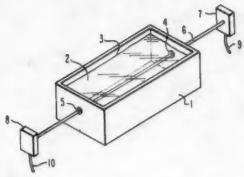
Ronald T. Harrold, Franklin, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 28, 1984, Ser. No. 625,763
Int. Cl.[4] G01N *29/00*
U.S. Cl. 73—590 20 Claims

1. A method of monitoring physical or chemical changes in a resinous host material that passes from a liquid state to a solid state comprising:

(1) placing a waveguide in said resinous host material while it is in said liquid state, said waveguide extending outside of said resinous host material;

(2) solidifying said host material, embedding said waveguide therein; and



(3) monitoring sound waves in said waveguide after said sound waves have passed through said waveguide in said material.

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**4,590,804**

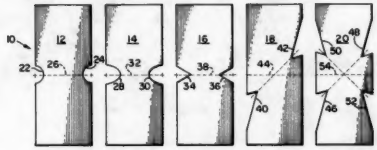
**DEVICE FOR MONITORING FATIGUE LIFE**

**Maurice A. Brull, Herzliya Pituach, Israel, assignor to Tensiodyne Scientific Corporation, Philadelphia, Pa.**

**Filed Jan. 23, 1984, Ser. No. 573,081**

**Int. Cl.[4] G01N *19/08***

**U.S. Cl. 73—762** **17 Claims**



**1**. A device for monitoring the fatigue life of a member comprising a plurality of substantially flat, elongated coupons fabricated of the same material as the member being monitored, the coupons being secured in parallel to the member so that all of the coupons experience the same strain history as the member, each of the coupons having a stress concentrating notch pattern comprised of at least one pair of notches, one notch of the notch pair being disposed on each of the longitudinal sides of a coupon, the notches of the notch pair being substantially geometrically the same and substantially aligned with each other, the notch pattern of each of the coupons varying in intensity from mild, in which the edge surfaces of the notches are generally smooth and continuously curved, to severe, in which the edge surface of each of the notches exhibits a sudden change to form two portions which are in different planes, the two portions meeting to form a line so that the application of the same strain to all of the coupons results in the development of different stress concentrations near the notches of each coupon so that each coupon has a different fatigue life, the fatigue life of each coupon being a percentage of the fatigue life of the member being monitored.

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**4,590,805**

**ULTRASONIC IMPELLER FLOWMETER**

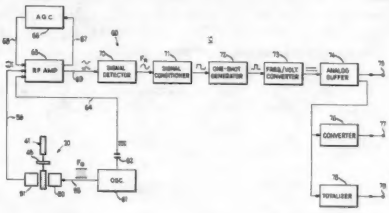
**James D. Baird, Naperville, and Brad D. Baird, Winfield, both of Ill., assignors to Baird Controls, Inc., Naperville, Ill.**

**Filed Oct. 26, 1984, Ser. No. 665,051**

**Int. Cl.[4] G01F *1/06***

**U.S. Cl. 73—861.87** **15 Claims**

**14**. An ultrasonic flowmeter for measuring fluid flow through a conduit, said flowmeter comprising: paddle wheel means supported by the conduit for rotation by the fluid flowing therethrough about an axis inclined with respect to the direction of fluid flow at a speed proportional to the rate of fluid flow, ultrasonic transducer means for establishing a beam of ultrasonic energy including an ultrasonic energy signal acoustically coupled to said paddle wheel means by the fluid, said beam of ultrasonic energy extending substantially parallel to the axis of rotation of said paddle wheel means, said paddle



wheel means including means for modulating said carrier signal as a function of the speed of rotation of said paddle wheel means to produce an output signal, and indicating means coupled to said transducer means and responsive to said output signal for producing an indication representative of the rate of flow of fluid through the conduit.

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**4,590,806**

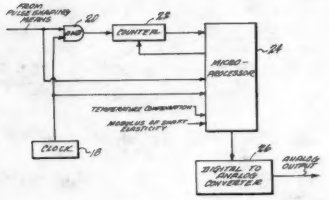
**MONOPOLE DIGITAL VERNIER TORQUE METER**

**David B. Lutton, Bristol, and Joel N. Melnick, Vergennes, both of Vt., assignors to Simmonds Precision Products, Inc., New York, N.Y.**

**Filed Oct. 3, 1984, Ser. No. 657,276**

**Int. Cl.[4] G01L *3/12***

**U.S. Cl. 73—862.34** **24 Claims**



**18**. A monopole digital vernier torque meter method for measuring the torque transmitted by a rotating shaft, said method comprising the steps of:

providing first and second toothed wheels fixed to said shaft at spaced apart locations, said toothed wheels having different respective numbers of teeth juxtaposed at a predetermined rotational interface so as to define a vernier overlapping relationship therebetween wherein the relative angular location of a predetermined degree of tooth overlap changes as a function of the torque transmitted by said shaft and said toothed wheels also comprising a uniquely sensible reference location;

monitoring said teeth at said rotational interface with a monopole sensor to produce an electrical output signal including pulses which represents the passage thereby a of a tooth or of overlapped teeth and which also includes a unique signal component representing the passage thereby of said reference location; and

digitally processing said electrical output by measuring the relative durations of individual pulses in said electrical output signal to detect the instantaneous angular location of vernier tooth positions with respect to said reference location and thereby to produce an electrical torque out-

put signal representative of the torque being transmitted by said shaft.

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**4,590,807**

## TORQUE SENSOR OF NONCONTACT TYPE

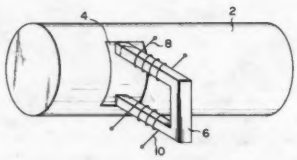
**Tadahiko Kobayashi, Yokohama; Masashi Sahashi, Fujisawa; Koichiro Inomata, Yokohama; Tomokazu Domon, Yokosuka, and Hironori Fukuda, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Dec. 17, 1984, Ser. No. 682,269**

**Claims priority, application Japan, Dec. 17, 1983, 58-238658; Mar. 13, 1984, 59-47907; Mar. 19, 1984, 59-52809**

**Int. Cl.[4] G01L** *3/10*

**U.S. Cl. 73—862.36** **20 Claims**




1. A torque sensor of noncontact type for sensing a torque applied to a shaft having a circumferential length Ls, comprising:

a first magnetic ribbon provided on a circumferential portion of the peripheral surface of said shaft and made of a magnetic material, said first magnetic ribbon having a circumferential dimension L0 equal to or smaller than one-half of the circumferential length Ls of said shaft and being preliminarily given an induced magnetic anisotropy in a direction at an angle with respect to the circumferential direction;

a first core member made of a magnetic material and having end faces, which face said first magnetic ribbon, with a gap between the faces, the center-to-center distance L1 between said end faces of said first core member being

$$L1 \leqq L0 \leqq 2L1$$

with respect to the circumferential dimension L0 of said first magnetic ribbon;

a first exciting coil wound on said first core member for producing a magnetic flux; and

a first detecting coil wound on said first core member for detecting the magnetic flux produced by said first exciting coil and delivered to said first core member through said first magnetic ribbon to produce an output signal.

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**4,590,808**

## METHOD AND APPARATUS FOR DETERMINING TENSION AND PRESSURE

**Benjamin H. Lightfoot, 13515 Krestwood Dr., Burnsville, Minn. 55337, and Harold W. Atkins, 7121 Tralee Dr., Edina, Minn. 55435**

**Filed Aug. 24, 1984, Ser. No. 644,219**

**Int. Cl.[4] G01L** *5/10*

**U.S. Cl. 73—862.48** **11 Claims**

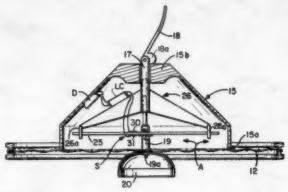
1. A device for determining the tension factor in a grid, said device having in combination,

a frame structure defining a predetermined test area and adapted to be mounted on a first side of the grid in contact therewith,

means for producing two measurement components, comprising a deflection component and a force component,

application means for applying one of said measurement components to the defined test area of the grid on the second side of the grid,

sensing means for sensing the value of the other measurement component resulting from the application of the first component, and




means for producing from the values of the two components the tension factor in the elements forming the grid.

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**4,590,809**

## SAMPLER AND AN APPARATUS FOR HYDROGEN DETERMINATION IN MOLTEN METAL

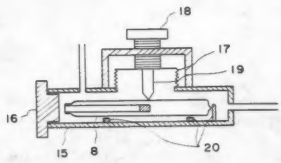
**Takashi Ohtsubo; Hirahisa Kawase, and Syunsuke Goto, all of Kawasakishi, Japan, assignors to Nippon Steel Corporation and Japan Analyst Corporation, both of Tokyo, Japan**

**Continuation-in-part of Ser. No. 572,531, Jan. 19, 1984, abandoned. This application Jun. 24, 1985, Ser. No. 748,134**

**Claims priority, application Japan, Jan. 22, 1983, 58-6748[U]; Jan. 31, 1983, 58-12649**

**Int. Cl.[4] G01N** *1/12*

**U.S. Cl. 73—863.53** **7 Claims**




1. A sampler for drawing a sample of molten metal for analysis for hydrogen, said sampler comprising:

a tubular body of inorganic refractory material having low thermal conductivity and being substantially impermeable to hydrogen, and having a readily meltable portion at one end and a hydrogen collection chamber at the other end;

an inner tube completely enclosed within said tubular body and being of a hydrogen permeable metal impermeable material capable of withstanding the temperature of the molten metal being sampled and having a cylindrical space therewithin and means for mounting said inner tube within said tubular body for defining with the inner surface of said tubular body an annular space between said inner tube and said body, said inner tube having apertures therein communicating said spaces, one of said spaces being open at the end corresponding to said one end of said tubular body to said readily meltable portion for receiving molten metal thereinto when the meltable portion is melted when the one end of the sampler is inserted into a bath of molten metal; and

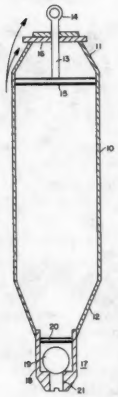
means sealing the end of said one space which is toward the other end of said tubular body from said hydrogen collection chamber, the other of said spaces being open to the hydrogen collection chamber at the end corresponding to the other end of said tubular body, and having the end corresponding to the one end of said tubular body closed off from said readily meltable portion.

4,590,810

## LIQUID SAMPLE COLLECTOR AND METHOD FOR OBTAINING SAMPLES

Geoffrey G. Hunkin, 9 Meadow Lark La., and Thomas A. Reed, 6458 S. Garland Ct., both of Littleton, Colo. 80123

Filed Jun. 15, 1984, Ser. No. 620,864
Int. Cl.[4] G01N 1/12
U.S. Cl. 73—864.63 9 Claims



1. A liquid sample collecting device comprising: an elongated cylindrical sample collection vessel for use in an upright position and having an upper valve and a lower valve for controlling the movement of liquid upwardly into and through said vessel,

said vessel having top and bottom end walls and having its top end wall decreasing in cross section axially from the lowest to the uppermost part thereof and having respective central openings in said end walls for the passage of fluid therethrough under control of said valves, said upper valve including a plate covering the central opening in said top end wall and having a peripheral portion of said plate projecting substantially beyond the outside surface of said top end wall and having its peripheral edge at a distance from the axis of said vessel less than the radius of said vessel, whereby the force of liquid moving over the outer wall of said vessel acts against said peripheral portion and assists the internal pressure in opening said upper valve,

means dependent upon the direction of vertical movement of said vessel in a body of liquid to be sampled for opening said valves during downward movement and for closing said valves upon stopping of downward movement and during upward movement,

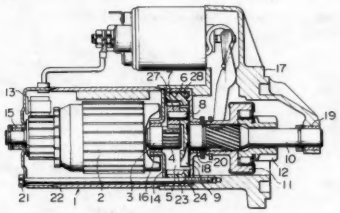
whereby when said vessel is lowered into a body of liquid to a predetermined submerged position said valves are opened during the downward movement and liquid moves through said vessel and on stopping downward movement the valves are closed to trap a sample of the liquid and are maintained closed during upward movement for delivering the sample to the surface.

4,590,811

## REDUCTION STARTER

Fumiaki Kasubuchi, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed May 31, 1984, Ser. No. 615,523
Claims priority, application Japan, May 31, 1983, 58-95035; Mar. 2, 1984, 59-38860
Int. Cl.[4] F02N 15/06; F16H 1/32
U.S. Cl. 74—7 E 7 Claims



1. A reduction starter including a starter motor having an armature shaft, a reduction gear mechanism having a sun gear fixed to an end of said armature shaft and an output shaft disposed coaxially with said sun gear, a pinion gear carried by said output shaft and a center bracket rotatably supporting said output shaft,

wherein said reduction gear mechanism is formed by a planetary gear mechanism comprising an input shaft formed by the shaft of said sun gear, planet gears mounted for revolution about the axis of said sun gear and drivingly connected to said output shaft, and an outer ring gear mounted for displacement within a limited range in directions substantially perpendicular to the common axis of said input and output shafts,

said outer ring gear is provided with recesses formed in one end face of said outer ring gear, and said center bracket is provided with projections engaged with said recesses to hold said outer ring gear against rotation, and

said center bracket has a generally cup-like shape having an inner diameter approximately equal to the outer diameter of said outer ring gear and said bracket accommodates said outer ring gear.

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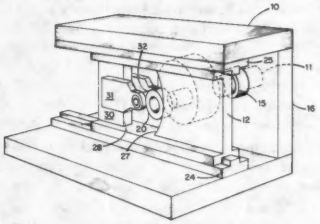
4,590,812

## DEVICE FOR CONVERTING BETWEEN ROTARY AND RECTILINEAR MOTION

Douglas C. Brackett, 59 A St., Manchester, N.H. 03102

Filed Jun. 16, 1983, Ser. No. 504,934
Int. Cl.[4] F16H 25/08, 25/16
U.S. Cl. 74—55 12 Claims



1. A device for converting linear motion to rotary motion or vice versa, comprising a rotatable crank, having a crankpin and a bearing element rotatably mounted on said crankpin, and a slide mounted for reciprocating linear movement, said slide

including a first arcuate bearing surface located on one side of said crankpin in continuous engagement with said bearing element as said bearing element moves back and forth along said first arcuate bearing surface and a second arcuate bearing surface located on an opposite side of said crankpin in continuous engagement with said bearing element as said bearing element moves back and forth along said second arcuate bearing surface, said second arcuate bearing surface being rotatable in response to the rotation of said bearing element, whereby the linear motion of said slide is continuously converted into the rotary motion of said crank or vice versa.

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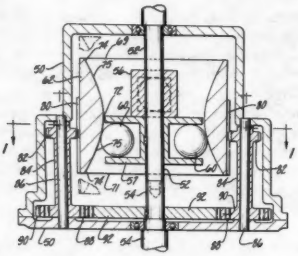
**4,590,813**

## INERTIA TRANSMISSION

**Erwin F'Geppert, Oakland County, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Oct. 24, 1983, Ser. No. 544,663**
**Int. Cl.[4] F16H *33/02, 33/08***
**U.S. Cl. 74—64** **10 Claims**



1. A power transmission comprising a rotary drive member (**52**); a rotary driven member (**54,92**); an annular cam follower member (**62**) surrounding the drive member; means (**66**) confining the cam follower member to reciprocatory motion along the drive member rotational axis; radially-movable inertia rollers (**58,60**) of high density material carried by the drive member in pressure engagement with the cam follower member to translate drive member rotation into cam follower member reciprocation; and one-way drive means (**88**) operatively disposed between the cam follower member and rotary driven member, whereby said driven member is driven rotationally;

said annular cam follower member defining a series of endless cam follower surfaces occupying parallel planes normal to the drive member rotational axis; each said cam follower surface comprising first surface sections located relatively close to the drive member rotational axis and second surface sections located relatively remote from the drive member rotational axis, said first surface sections transitioning smoothly into said second surface sections to form an endless cam follower surface operable to oscillate the associated rollers radially toward and away from the drive member axis;

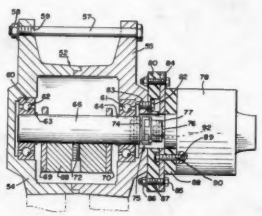
the second surface section in some of the endless cam follower surfaces being spaced further away from the drive member rotational axis than the second surface sections in other ones of the endless cam follower surfaces to vary the roller oscillation stroke in accordance with positional changes of the annular member.

**4,590,814**

## VIBRATION DAMPENING APPARATUS FOR MOTOR ACTUATED ECCENTRIC FORCES

**Theodore S. Wadensten, Wyoming, R.I.**

**Continuation-in-part of Ser. No. 196,310, Oct. 14, 1980, abandoned. This application May 26, 1983, Ser. No. 498,924**
**Int. Cl.[4] F16H *33/10***
**U.S. Cl. 74—87** **3 Claims**



1. Vibration damping apparatus mechanism in which at least one eccentric weight is carried on and by a rotating shaft, thereby inducing vibrations and isolating vibrations so as to avoid transmitting vibrations from said shaft to a motor rotating said shaft, the damping apparatus including:

(a) an independent housing formed so as to have a cavity within which at least one eccentrically disposed weight may be and is rotatably moved, said housing made of two halves to provide a lap joint closure;

(b) at least one eccentric weight secured to said shaft so as to be rotated as the support shaft is rotated;

(d) a pair of anti-friction bearings carrying said support shaft, said bearings mountable in bored portions of said independent housing, said bearings sized and having a capability for accommodating the forces of vibration from the eccentric weight to the support shaft as said shaft is rotated;

(e) a first coupling half of a three-piece flexible coupling, this first half mounted and secured to one end of said support shaft;

(f) a motor including a rotor and housing frame and for operational use positioned adjacent the independent housing;

(g) a resilient central member portion of said three-piece flexible coupling, said coupling in a mounted condition adapted for transmitting torque as developed by said motor to the support shaft, with said three-piece flexible coupling substantially eliminating a transmission of vibration forces developed in and by said rotated shaft;

(h) a second coupling half of said three-piece flexible coupling, this second half mounted on and secured to an output shaft of said motor, said second coupling half adapted to engage said resilient central portion of the three-piece flexible coupling, said coupling in an assembled condition transmitting torque from the motor shaft to the support shaft, with the resilient central portion damping the vibrations from the rotation of the eccentric weight and substantially eliminating transmittal of said forces of vibration from the support shaft to said motor shaft, and

(i) a motor having a rotor within a housing frame, said motor positioned adjacent and secured to said independent housing and with unwanted transmittal of vibrations from the rotation of the eccentric weight within the independent housing to the motor housing frame inhibited by isolation and damping means which is interposed between the independent housing and motor housing frame, and including at least one resilient ring-like member secured to the independent housing by a plurality of securing means and with this resilient ring-like member secured to a rigid plate-like member which is secured to the housing frame of the motor by a second securing means, first and second securing means disposed so as to engage the rigid plate-

like member, with resilient portions of the ring-like member providing for an absorbing capability when and as interposed between the independent housing and motor housing frame.

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4,590,815

## MULTIPLE CONE TYPE VARIABLE POWER TRANSMISSION MECHANISM

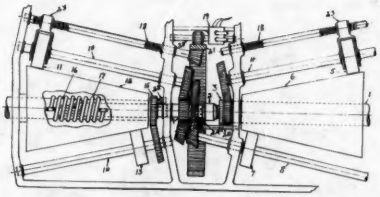
Frank R. Sargent, 361 Talbott Ave., Laurel, Md. 20707

Filed Oct. 5, 1984, Ser. No. 658,295

The portion of the term of this patent subsequent to Jul. 17, 2001, has been disclaimed.

Int. Cl.[4] F16H *15/16, 13/00*

U.S. Cl. 74—191 3 Claims



1. A computer controlled, constant meshed and integrated continuously variable power transmission system comprising:

(a) an input shaft having foreward and reverse gears selectively coupled thereto by a clutch,

(b) an output shaft coaxial with the input shaft,

(c) idler cones rotatably mounted on input and output shafts,

(d) a plurality of pairs of jackshafts equally spaced about the input and output shafts; each pair comprising a drive jackshaft and a driven jackshaft diametrically opposed relative to input jackshaft;

(i) each drive jackshaft having a first gear means for cooperating with said forward and reverse gears such that when the forward gear is coupled to the input shaft the drive jackshafts rotate in a first direction and when said reverse gear is coupled to the input shaft the drive jackshafts rotate in a second direction,

(ii) each driven jackshaft of the first cone connected to the input jackshaft of the second cone by a second gear means,

(iii) each jackshaft having a wheel nonrotatably and slidably mounted thereon in constant frictional contact with the idler cones, and

(e) actuator means for controlling in tandem the position of the wheels of each jackshaft pair along their associated jackshafts;

(i) a ring gear, turned by a hydraulic driven control gear, drivingly connected to a worm gear splined through the yoke(23) of each input and output drive wheel in a manner to move said drive wheels in tandem to any predetermined position on the cones,

(f) torque responsive control means coupled to said output shaft for sensing the power needs of the output shaft relative to the torque of the input shaft and for controlling said actuator means, whereby positions of the wheels along the jack shafts are varried, thus the gear ratio of the transmission is a function of the sensed torque ratio.

4,590,816

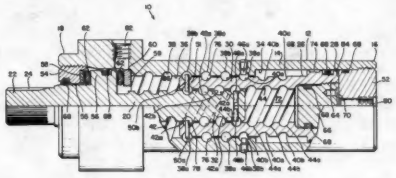
## BALL SCREW ACTUATOR

Paul P. Weyer, 48811 128th Ave. Southeast, Enumclaw, Wash. 98022

Filed Jan. 30, 1984, Ser. No. 575,228

Int. Cl.[4] F16H *1/18, 1/20;* F01B *3/00*

U.S. Cl. 74—424.8 NA 46 Claims



41. A fluid-powered actuator, comprising:

a body having first and second ends;

a shaft disposed within said body and supported for rotation relative thereto, said shaft having a torque-transmitting first ball race;

a first stop axially stationary with respect to said shaft for engaging and limiting travel of balls along said first ball race toward said first end;

a piston reciprocally mounted within said body and having a head for application a fluid pressure to one or the other opposing sides of said head to produce axial movement of said piston toward said first or second end, said piston further having an elongated sleeve with said shaft extending interior of said sleeve, said sleeve having a torque-transmitting second ball race corresponding to and confronting said first ball race to form a channel defined by the area of coincidence of said first and second ball races, said channel being helical, said second ball race extending over a sufficient axial length of said sleeve projecting beyond said first stop toward said first end, as measured with said piston positioned at its end limit of travel toward said first end, to permit substantially unimpeded rolling travel of balls within said channel toward said second end as said piston travels from an end limit of travel at said first end to an end limit of travel at said second end;

one or more balls seated in said channel to a side of said first stop toward said second end for transmitting torque between said piston and said shaft upon axial movement of said piston by the application of fluid pressure to said head; and

means for transmission of torque between said piston and said body.

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4,590,817

## GEAR SELECTOR MEANS

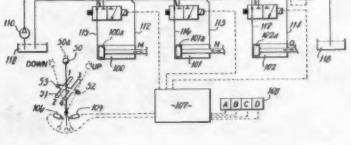
John S. Bennett, Ufton, England, assignor to Massey-Ferguson Inc., Detroit, Mich.

Filed Mar. 1, 1984, Ser. No. 585,971

Claims priority, application United Kingdom, Mar. 15, 1983, 8307095

Int. Cl.[4] B60K *20/02*

U.S. Cl. 74—473 R 8 Claims




1. A gear selector means for use with a transmission having

a main change speed gear set providing a plurality of change speed ratios and one or more associated range change gear sets, providing a plurality of transmission ranges, the selector means including a selector member which is movable to a plurality of positions for the selection of a said plurality of change speed ratios of the transmission and which has a neutral position or series of positions corresponding to a neutral condition of the transmission, the selector member being movable from the or a neutral position to a single "up" position in which upward range changes can be made in a predetermined sequence and to a single "down" position in which downward range changes can be made in a predetermined sequence, each movement of the selector member to said "up" or "down" position being arranged to change the operative range of the transmission either up or down to the next range in said predetermined sequence.

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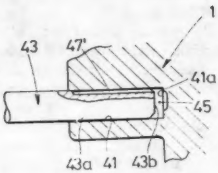
**4,590,818**

**SPEED CHANGE GEAR SHIFT ROD**

**Masao Teraoka, Tochigi, Japan, assignor to Tochigifujisangyo Kabushikigaisha, Tochigi, Japan**

**Filed Apr. 6, 1984, Ser. No. 597,510**
**Claims priority, application Japan, Apr. 7, 1983, 58-50906**
**Int. Cl.[4] G05G *9/14***
**U.S. Cl. 74—473 R** **2 Claims**




**1**. A speed change gear shift rod having an end section located within a blind supporting hole formed in the casing of a gear change box and being slideable within said blind supporting hole along its longitudinal axis, the improvement comprising an oil containment section being confined by at least an end surface of said shift rod and a ring-like inner wall at the bottom end of said blind supporting hole and the back surface of said blind supporting hole so that both surfaces are separated from each other by the sliding of said shift rod, said oil containment section being formed on a periphery of said end section of said shift rod as a groove extending along the longitudinal axis of said shift rod to the end thereof.

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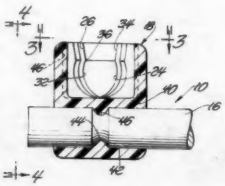
**4,590,819**

**MOTION TRANSMITTING REMOTE CONTROL ASSEMBLY MOLDED TERMINAL CONNECTOR**

**Arthur L. Spease, Livonia, and Holly Walston, Utica, both of Mich., assignors to Teleflex Incorporated, Limerick, Pa.**

**Continuation of Ser. No. 392,764, Jun. 28, 1982, abandoned. This application Mar. 18, 1985, Ser. No. 712,614**
**Int. Cl.[4] F16C *1/14***
**U.S. Cl. 74—501 R** **20 Claims**




**1**. A motion transmitting remote control assembly (**10**) comprising: guide means (**12**); core means (**16,54**) movably supported by said guide means (**12**) and extending therefrom to provide a variable extending length of said core means (**16,54**), said extending length defining a line of force, and an integral terminal member (**18,48**) disposed on said extended length for operatively interconnecting said core means (**16,54**) and a control member (**20**) to translate movement therebetween along said line of force, said terminal member (**18,48**) including a cup-shaped pocket (**24**) extending therein and having a center axis perpendicular to said line of force, said pocket (**24**) including integral retaining means for retaining a portion of the control member (**20**) within said pocket (**24**) and characterized by said terminal member (**18,48**) including a plurality of slots (**26**) originating at said center axis and extending radially from said center axis and partially into said terminal member (**18,48**) at an angle relative to said line of force.

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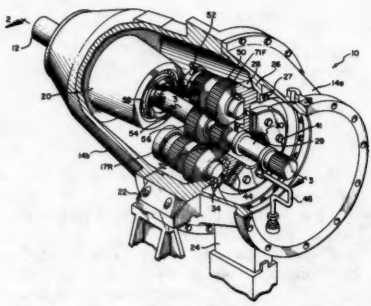
**4,590,820**

**ROTATIONAL POWER TRANSMISSION APPARATUS**

**James C. Hambric, Wellsville, N.Y., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed Mar. 31, 1983, Ser. No. 480,678**
**Int. Cl.[4] F16H *37/04, 57/04***
**U.S. Cl. 74—640** **20 Claims**



**18**. Apparatus for transmitting rotational energy, from a prime mover having a first shaft, to a torque load driven by a second shaft, comprising:

a. a bearingless third shaft disposed coaxially between said first shaft and said second shaft;

b. non-helical spur gear train means, having at least three compound star gears, for rotating said second shaft, each of said star gears defining a first reduction gear and a first reduction pinion, said first reduction pinions being rotationally coupled to said second shaft;

c. a first non-helical spur gear, meshing individually with said first reduction gears, at one end of said bearingless third shaft to radially support said bearingless third shaft; and

d. coupling means for coupling the opposite end of said bearingless third shaft to said first shaft,

whereby said bearingless third shaft is free-floating while the pitch circle of said first spur gear remains substantially tangent to the pitch circles of said first reduction gears.

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**4,590,821**

**BOTTLE CAP REMOVER**

**James C. Olson, 7555 NE 33rd Dr., Portland, Oreg. 97211**

**Filed Nov. 9, 1984, Ser. No. 670,327**
**Int. Cl.[4] B67B *7/02***
**U.S. Cl. 81—3.37** **7 Claims**

**1**. In a closure remover for a bottle,

a frame, said frame being of L-shape and having a vertical portion and a horizontal portion, the latter being adapted

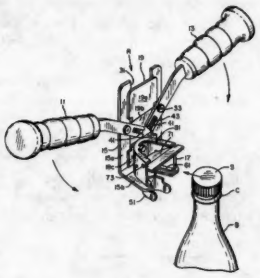
for engagement below a chime on the neck of the bottle to establish a thrust relationship therewith,

a carriage for engagement beneath a portion of the closure to establish a thrust relationship therewith

said vertical frame portion being vertically slotted,

means mounting said carriage in the vertically slotted portion of said frame for vertical rectilinear sliding movement from a down to an up position,

a pair of levers having handle portions,



means pivotally mounting said levers on said frame for downward movement or for upward movement in a common plane, and for lifting said carriage upon downward movement to apply an upward dislodging force on said closure, and disposing said handle portions approximately horizontally when said carriage is in its down position, and disposing said handle portions in downwardly extending approximately vertical positions when said carriage is in its up position, said L-shaped frame providing clearance for the movement of said handle portions in the just described manner.

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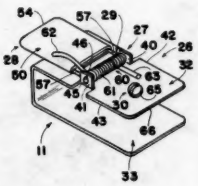
**4,590,822**

## BEVERAGE CAN OPENING APPARATUS

**Carl E. Dusko, 1407 11th Ave. South, Great Falls, Mont. 59405**

**Filed Apr. 23, 1985, Ser. No. 726,655**
**Int. Cl.[4] B67B *7/40***
**U.S. Cl. 81—3.55** **13 Claims**




1. Beverage can opening apparatus including a base portion, a support portion, a can engaging portion, a biasing portion and a fastening portion; said base portion including a substantially flat plate section; said support portion including spaced shaft supporting sections disposed adjacent spaced elongated edges of said plate section, said shaft support sections being disposed substantially parallel to each other, each of said shaft supporting sections including an opening in a plane parallel to one of said elongated edges, said openings being spaced from said plate section, a shaft extending between said openings of said shaft supporting sections; said can engaging portion including an elongated member pivotally connected at one end to said shaft and extending therefrom toward and beyond one end of said plate section, said elongated member including a slot at a free end thereof beyond said plate section, said slot being aligned substantially parallel to said plate section, said elongated member including a channel extending from said slot toward said support portion, said channel having a cross section substantially the same as said slot; said biasing portion including a coil spring member carried axially on said shaft, said coil spring member including a coiled section and an elongated section at each end thereof extending in opposite directions from said coiled section substantially perpendicular to the axis thereof, one of said elongated sections being in contact with said can engaging portion and the other elongated section being in contact with said plate section; said fastening portion including a threaded member extending through said plate section adjacent an end thereof remote from said slot of said can engaging portion; whereby applying forward and downward pressure to a beverage can having its pull tab inserted into said slot of said can engaging portion will cause pivoting thereof downwardly away from said plate section and simultaneously tilting of said tab to open said can.

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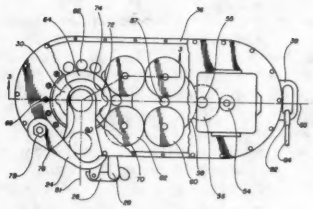
**4,590,823**

## DUAL-STRING TUBING TONG AND METHOD

**Billy W. Neves, and Emery L. Eckel, both of Odessa, Tex., assignors to Eckel Manufacturing Company, Inc., Odessa, Tex.**

**Filed Oct. 9, 1984, Ser. No. 658,822**
**Int. Cl.[4] B25B *21/00***
**U.S. Cl. 81—57.14** **21 Claims**



1. A power tong for making up and breaking apart first and second strings of tubing each having an outside diameter of from 3.5 inches to 0.75 inches and vertically positioned for a drilling operation, comprising:

a tong body having a first open throat portion for receiving said first and second strings of tubing;

a door pivotable about said tong body for opening to receive said strings of tubing and for closing across said first open throat portion;

a ring member including one or more camming surfaces rotatably mounted within said tong body and having a second open throat portion for alignment with said first open throat portion;

a cage plate assembly rotatably mounted at least partially within said tong body and having a third open throat portion for alignment with said first and second open throat portions;

drive means for rotating said ring member;

a plurality of heads carried by said cage plate assembly for being forced by engagement with said camming surfaces into gripping engagement with said first string of tubing upon rotation of said ring member relative to said cage plate assembly;

an outermost surface of said rotatable ring member and cage plate assembly and an inner surface of said door when closed across said first open throat portion defining an opening therebetween within said first open throat portion for receiving said second string of tubing while said ring member and cage plate assembly are rotating for making up or breaking apart said first string of tubing; and

stop means supported by said tong body and positionable within said first open throat portion for prohibiting said

second string of tubing from engaging said outermost surface of said rotatable ring member and cage plate assembly.

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**4,590,824**

## SCREWDRIVER

**Cloyd Cushman, Rte. 2, Yale, Okla. 74085**

**Filed Nov. 21, 1984, Ser. No. 673,601**
**Int. Cl.[4] B25B** *23/00*
**U.S. Cl. 81—440** **6 Claims**

1. An improved screwdriver comprising:

(a) a hollow handle means having a central opening colinear to said handle means wherein the sidewalls of said handle near the mouth of the opening are slotted on opposite sides such as to allow a reversible screwdriver blade to extend from and retract into said opening and in the fully extended position pivot through said slots and wherein said central opening is further equipped with at least one offset recess adapted to accept one end of said reversible screwdriver blade in a semi-extended position and hold the blade at an angle oblique to said handle;

(b) a reversible screwdriver blade having a screwdriver tip at each end of said blade and a central slot in said blade longitudinal to the direction of said blade wherein said reversible screwdriver blade is operatively held within said central opening of said handle; and

(c) an axle extending across the mouth of said opening in said handle and through the central slot in said blade such that said reversible blade can pivot about said axle through said slots in said handle when said blade is in the fully extended position.

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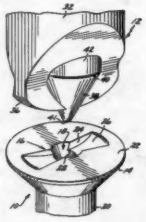
**4,590,825**

## HIGH TORQUE FASTENER AND DRIVING TOOL

**John Vaughn, P.O. Box 3368, Granada Hills, Calif. 91344**

**Continuation-in-part of Ser. No. 492,164, May 6, 1983, Pat. No. 4,497,225. This application Oct. 11, 1984, Ser. No. 659,715**
**Int. Cl.[4] B25B** *15/02*
**U.S. Cl. 81—451** **7 Claims**



1. A driving tool for use in combination and relatively high torque engagement with a high torque fastener having a head at one end of a threaded shank and said head defining a driving face presented in an axially outboard direction, said driving face including a recessed driving slot of generally bow-tie shaped configuration defined by at least slightly undercut side walls and an arcuately concave bottom wall centered generally on the longitudinal axis of said shank, and a generally conical recess centered generally on the driving slot with a base diameter substantially greater than the central width of the driving slot and on the order of the width of the driving slot at the opposite ends thereof, and an apex disposed within said head at a depth generally twice the maximum depth of said driving slot bottom wall, comprising:

a tool shaft;

a driving blade at one end of said tool shaft in a position centered generally on a longitudinal axis of said shaft and defined by a pair of side walls, said blade having a width at least slightly less than the central width of said driving slot and an arcuately convex lower surface presented in an axially outboard direction for engagement with the concave bottom wall of said fastener driving slot; and

a generally conical blade tip formed on said driving blade in a position generally centered on said tool shaft longitudinal axis, said blade tip having a base diameter blending relatively smoothly with said blade side walls at a position spaced inboard relative to said convex lower surface and a generally pointed end apex projecting axially a substantial distance beyond said blade convex lower surface, said blade tip being sized for generally mating reception into said fastener conical recess when said driving blade convex lower surface is seated upon said driving slot bottom wall.

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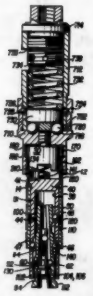
**4,590,826**

## COMBINATION STUD DRIVING TOOL AND TORQUE LIMITING DEVICE

**John A. McKean, Fairview, Pa., assignor to Titan Tool Company, Fairview, Pa.**

**Continuation-in-part of Ser. No. 466,069, Feb. 14, 1983, Pat. No. 4,513,643, which is a continuation-in-part of Ser. No. 360,821, Mar. 24, 1982, Pat. No. 4,470,329, which is a continuation-in-part of Ser. No. 265,706, May 21, 1981, abandoned, and a continuation-in-part of Ser. No. 405,365, Aug. 5, 1982, abandoned, which is a continuation of Ser. No. 179,444, Aug. 19, 1980, abandoned. This application Feb. 17, 1983, Ser. No. 490,620**
**Int. Cl.[4] B25B** *19/00*
**U.S. Cl. 81—53.2** **17 Claims**



1. A connector between two rotary driven tools, an upper tool and a lower tool, wherein a rotational output of the upper tool is transmitted through said connector to the lower tool, and the lower tool has a carriage rotatably disposed within a lower tool body of the lower tool, the connector comprising:

(i) an adaptor housing secured to the the upper tool for rotation therewith, said adaptor housing having a socket and being axially secured to said lower tool body at an internal surface of said socket of the adapter housing to permit said lower tool body to rotate relative to said adaptor housing; and

(ii) a driven head axially secured to the adaptor housing for rotation therewith, but removable from the housing during dissassembly, the driven head being disposed within the socket in which the lower tool body is secured to the adapter housing, said driven head and said carriage each

being provided with mating contours such that the driven head and the carriage can be selectively rotationally interconnected;

(iii) whereby the rotational output of the upper tool is transmitted through the adapter housing, to the driven head, and then to the carriage.

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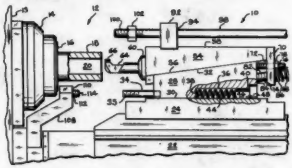
**4,590,827**

## RECESS TOOL HOLDER

**Jeffrey S. Wiltsie, Delphos, Ohio, assignor to Vanamatic Company, Delphos, Ohio**

**Filed May 7, 1984, Ser. No. 607,561**
**Int. Cl.[4] B23B** *29/034, 29/18*
**U.S. Cl. 82—11** **10 Claims**



1. A tool holder for a recess cutting tool that can make a recess cut in a workpiece, said holder being positioned on a machine tool, said machine tool having a spindle for holding said workpiece and a moveable tool slide for advancing said recess cutting tool towards said workpiece, said tool holder comprising:

an attachment bracket having one side removeably secured to said tool slide and said other side of said attachment bracket being spaced apart from said tool slide;

an adjustment slide having one side moveably positioned on said attachment bracket, said other side of said adjustment slide being spaced apart from said attachment bracket and being disposed at an angle with said tool slide;

a tool carrier means moveably positioned on said side of said adjustment slide that is spaced apart from said moveable tool slide, said tool carrier means adapted for securely holding said recess cutting tool, said tool carrier means having a side that is disposed at an angle with said tool slide and said side engaging said side of said adjustment slide that is disposed at an angle with said tool slide so that said tool carrier means is radially displaced with respect to said tool slide to make said recess cut in said workpiece when said adjustment slide is advanced along said tool carrier towards said workpiece;

an adjustable rod connected to said adjustment slide, said rod extending from said adjustment slide in a direction toward said workpiece; and

an adjustable stop positioned on said machine tool adjacent said workpiece, said stop extending from said machine tool towards said adjustment slide, said stop being disposed in alignment with said rod on said adjustment slide whereby said stop and said rod can be positioned to control the advancement of said adjustment slide towards said workpiece and the radial position of said recess cutting tool with respect to said workpiece to compensate for wear in said spindle that holds said workpiece.

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**4,590,828**

## METAL CUTTING TOOL ADJUSTER AND COMPENSATOR

**Jack O. Sullivan, Auburn Heights, Mich., assignor to General Electric Company, Detroit, Mich.**

**Continuation of Ser. No. 453,194, Dec. 27, 1982, abandoned.**
**This application Nov. 29, 1984, Ser. No. 676,218**
**Int. Cl.[4] B23B** *21/00, 41/00*
**U.S. Cl. 82—24 R** **9 Claims**

1. A metal cutting tool holder and adjusting mechanism comprising in combination:

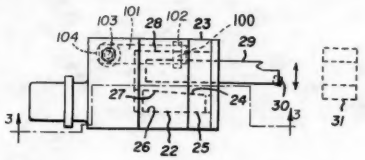
(a) rotational drive means;

(b) a housing and a cam means mounted therein for rotation by said rotational drive means;

(c) a cam follower means mounted on said cam means for axial motion therealong;

(d) a wedge block axially slidably contained in said housing and adapted to be moved axially by said cam follower means;

(e) said wedge block having a tapered transverse surface; and




(f) a tool holder block means transversely slidably contained in said housing and adjacent said wedge block;

(g) said tool holder block means having a tapered surface thereon slidably engaging the tapered surface of said wedge block but which is a reverse taper compared to the taper of said wedge block, said tapered surfaces being continuously maintained in contact by biasing means;

(h) so that the rotation of said rotational drive means drives the wedge block axially and said tapered surfaces cause said tool holder block to move in a non-pivotal radial direction relative to the axial movement of the wedge block.

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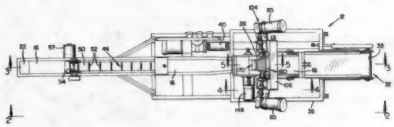
**4,590,829**

## FOOD SLICING METHOD AND APPARATUS

**Arthur R. Davidson, Canby, and Richard S. Livermore, Oregon City, both of Oreg., assignors to Amfac Foods Monterey, Inc., San Francisco, Calif.**

**Filed Jun. 15, 1984, Ser. No. 621,215**
**Int. Cl.[4] B26D** *1/53*
**U.S. Cl. 83—22** **18 Claims**



15. A method of slicing mushrooms, comprising:

providing a set of spaced-apart cutting blades;

providing a flume through which water of a depth greater than height of a mushroom flows;

feeding the mushrooms into one end of the flume through which water flows;

submerging the mushrooms in the flume to a depth sufficient to ensure that they will substantially orient themselves head end up upon surfacing;

allowing the mushrooms to float freely upward from the depth;

conveying the oriented mushrooms toward the blades by means of water flow in the flume;

operating the cutting blades to cause their adjacent faces to converge and diverge successively;

feeding said mushrooms to the blades as the blades commence to diverge;

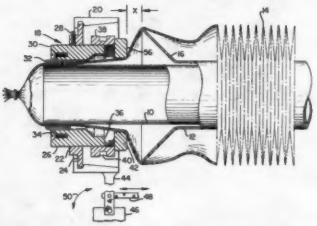
slicing said mushrooms within the blades; and

spraying a liquid between the blades in their divergent position to remove any slices adhering the blades.

## 4,590,830
## METHOD AND APPARATUS FOR CONTROLLING CASING HOLDBACK

**Hervé D. Duroyon, Beauvais, and Jean-Michel M. Sene, Warluis, both of France, assignors to Union Carbide Corporation, Danbury, Conn.**

**Filed Feb. 24, 1984, Ser. No. 583,313**
**Int. Cl.[4] A22C *11/02***
**U.S. Cl. 17—49** **16 Claims**



1. In a stuffing apparatus including a stuffing horn on which is mountable both a shirred casing supply and a sizing member which is disposable within a mounted casing and in contact with the inner surface of an unshirred portion of the casing, a mounting member adjacent the discharge of the stuffing horn and an engaging means carried by the mounting member and surrounding the stuffing horn for contacting the outer surface of unshirred casing to fold casing inwardly and through the engaging means as it is drawn over the sizing member, said engaging means being longitudinally adjustable with respect to said mounting member and comprising:

(a) an inner ring (**26**) fixed to said mounting member (**20**) and longitudinally adjustable with respect to said mounting member, and said inner ring having a first end **30** adjacent said stuffing horn discharge and a second end **36** adjacent said sizing member;

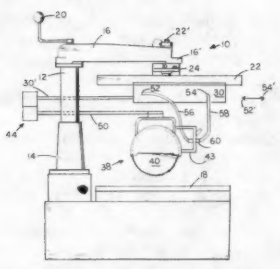
(b) seal means (**32**) on said first end (**30**) to snug unshirred unfolded casing to the outer surface of the stuffing horn; and

(c) adjustable means (**38**) carried at said second end (**36**), said adjustable means being longitudinally adjustable with respect to said inner ring towards and away from said sizing member.

## 4,590,831
## HYDRAULIC STROKE CONTROL FOR RADIAL ARM SAWS

**Ralph Brodin, Box 155, Girdwood, Ak. 99587**

**Filed Jan. 11, 1985, Ser. No. 690,612**
**Int. Cl.[4] B27B *5/20***
**U.S. Cl. 83—56** **19 Claims**



15. A method of continuously adjusting a restraining force exerted on a translating element so that the restraining force may be adjusted to desired settings as the element translates along its path of movement, said method comprising:

(a) moving the element along a path to perform a desired function;

(b) restraining the movement of the element during such movement along the path by providing a counterforce, said step of restraining comprising continuously adjusting the counter-force exerted on the moving element to oppose movement thereof;

(c) returning the translating element in a direction towards its original starting position;

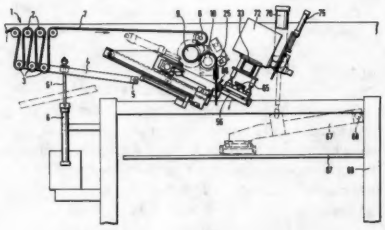
(d) exerting a counter-force on the translating element during said step (c);

(e) controlling the counter-force exerted on the translating element during its return movement of said step (c) so that such return counter-force is controlled to determine the speed and ease of return of the translating element, said step of controlling comprising continuously controlling the counter-force during the return of the element.

## 4,590,832
## APPARATUS FOR APPLYING WEB SECTIONS TO A FLAT WORKPIECE

**Ulrich Eckelt, Tecklenburg, Fed. Rep. of Germany, assignor to Windmöller & Hölscher, Lengerich, Fed. Rep. of Germany**

**Filed Apr. 18, 1984, Ser. No. 601,547**
**Claims priority, application Fed. Rep. of Germany, Apr. 20, 1983, 3314374**
**Int. Cl.[4] B26D *7/06***
**U.S. Cl. 83—100** **7 Claims**



1. Apparatus for applying to a flat workpiece a web section severed from a web withdrawn from a supply reel, preferably an inner lock or base cover sheet to a pulled-open base or one that is already closed, said apparatus comprising:

a machine frame;

cutter carriage means carried by said frame for reciprocating movement toward and away from a web for cutting the web to provide a web section, said carriage means having a cutter movable transversely relative to the web;

web feeding means carried by said frame for intermittently feeding the web to a position adjacent said carriage means with said web freely suspended from said web feeding means, said carriage means positioned on one side of the suspended web;

suction gripping means carried by said frame on the opposite side of the suspended web from the cutter carriage means, said suction gripping means including a suction surface in communication with a source of suction, said suction surface adapted to receive and support a portion of the web;

sweeper means supported on said carriage means for movement through a plane defined by a freely suspended portion of the web, said sweeper means movable against the suspended portion of the web for sweeping the suspended portion of the web against the suction surface and away from the plane defined by the freely suspended web; and

pivoting means connected to said suction means for pivotally moving said suction surface through an acute angle from a first, web receiving position to a second, web depositing position to carry a cut web portion to the flat workpiece.

4,590,833

## AUTOMATIC FEED FOR FOOD-SLICING MACHINE

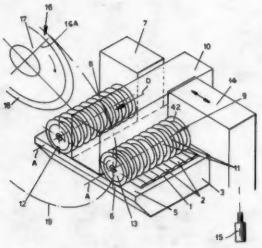
Gottfried Hain, Ramerberg, and Karl-Heinz Krebs, Grosskarolinenfeld, both of Fed. Rep. of Germany, assignors to Alpma Alpenland Maschinenbau & Co. KG, Rott am Inn, Fed. Rep. of Germany

Filed Aug. 1, 1984, Ser. No. 636,543

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1983, 3327747

Int. Cl.[4] B26D *7/06*

U.S. Cl. 83—367 9 Claims



1. In combination with a slicing machine having:

a table defining a horizontal and flat support surface having an outer edge, and

a blade displaceable transversely along the edge, whereby when the blade moves along the edge a slice is cut from an elongated foodstuff projecting longitudinally over the edge, a feed comprising:

a pair of cantilevered feed elements centered on and rotatable about respective parallel longitudinal axes spaced apart transversely above the surface to either side of the foodstuff and each formed with

a flat and unsupported outer end immediately juxtaposed with the edge, and

a helicoidal formation at least generally centered on the respective axis, engageable with the elongated foodstuff between the elements, and extending to the respective outer end;

biasing means for urging one of the feed elements radially of its axis toward the other element and thereby gripping the foodstuff between the elements; and

drive means for rotating the elements about the axes for advancing the foodstuff gripped between the elements in a longitudinal transport direction along the surface toward the edge, the foodstuff being gripped between the element ends immediately adjacent the table edge.

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4,590,834

## APPARATUS FOR SIMULTANEOUSLY CUTTING A PLURALITY OF PICTURE FRAME MATS

David D. Sobel, 15415 N. 22nd St., Phoenix, Ariz. 85022

Filed Sep. 28, 1984, Ser. No. 655,249

Int. Cl.[4] B26D *3/02, 7/02*

U.S. Cl. 83—455 7 Claims

1. A cutting apparatus for performing simultaneous uniform relatively spaced cuts in a plurality of picture frame mats simultaneously comprising

a cutter support,

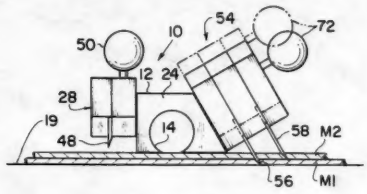
a clamp pivotally mounted on said support for movement between active cutting and inactive non-cutting positions,

a plurality of relatively spaced cutting means on said clamp and movable therewith on said support between active and inactive cutting positions,

means cooperating with said cutter support to guide the same for movement relative to said plurality of picture frame mats to be cut thereby,

means on said clamp means to pivotally move the same from its inactive cutting position to its active cutting position to produce relatively spaced cuts simultaneously in each of said plurality of mats with each of said plurality of cutting means such that said cuts are uniform and parallel to each other,

and said cutting means being blades projecting beyond said




clamp with at least one of said blades projecting from said clamp an amount greater than the others of said cutting blades to enable said greater projecting blade to make a deeper cut through all of the picture frame mats to be cut by said cutting means so as to completely cut through all of said picture frame mats while others of said blades cut through only certain selected ones of the mats.

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4,590,835

## CUTTER FOR FOOD MATERIALS

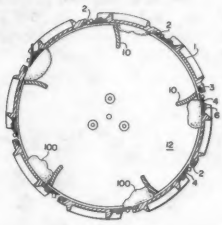
Takashi Matsuo, Hiroshima, Japan, assignor to Calbee Foods Co., Ltd., Tokyo, Japan

Filed Mar. 21, 1985, Ser. No. 714,390

Claims priority, application Japan, Mar. 23, 1984, 59-41522[U]

Int. Cl.[4] B26D *3/00*

U.S. Cl. 83—698 2 Claims

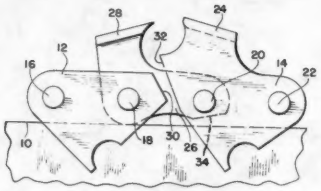


1. A cutter for food materials, comprising holder means including a corrugated distal end and an intermediate stepped portion forming a rearwardly extending groove, corrugated cutting means disposed on said holder means and including a corrugated cutting edge extending forwardly of the distal end of said holder means and a rearward end engaged in said groove, vertical cutting means located on said corrugated cutting means and including a plurality of vertically extending blades provided therein and spaced away from one another by a constant distance and a rearward end engaged in said groove, and clamp means and pressure fixedly attached to said holder means into engagement with said corrugated and vertical cutting means, the distal end edge of said clamp means having a corrugation corresponding to that of said corrugated cutting means and having slots each of which receives one of said vertically extending blades of said vertical cutting means and has a length larger than the width of the blade.

## 4,590,836
## SAFETY CHAIN FOR CHAIN SAWS

Gerald J. Doiron, Hyannis, Mass., assignor to Omark Industries, Inc., Portland, Oreg.

Filed Nov. 17, 1983, Ser. No. 552,825
Int. Cl.[4] B27B *33/14*
U.S. Cl. 83—834 12 Claims




1. A chain for a chain saw having the usual cutter bar with a substantially straight portion along which the chain travels, said chain comprising in-line articulated cutting tooth elements, cutting teeth on said elements, additional elements in the line of the cutting teeth, safety members on the additional elements leading said cutting teeth,

said additional elements being shiftable between two positions with respect to the cutting tooth elements in the chain as the chain travels along the substantially straight portion of the bar,

said positions including one in which said safety members, in the absence of pressure on the chain toward the bar, normally project beyond the cutting teeth and prevent them from cutting and another position with the safety members retracted with respect to the cutting teeth and allowing cutting,

and means limiting the degree of retraction.

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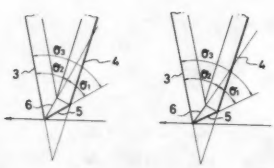
## 4,590,837
## SAW TEETH FOR HAND SAWS

Taro Nanba, 410-3, Ishigama, Sanjo-shi, Niigata-ken, Japan

Filed Sep. 23, 1983, Ser. No. 535,155
Claims priority, application Australia, Dec. 22, 1982, PF7376
Int. Cl.[4] B23D *57/00;* B27B *33/02*
U.S. Cl. 83—846 1 Claim

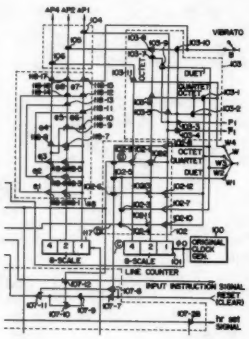



1. In a hand-saw, a saw blade having saw teeth including cutting edges whose cutting angles are progressively reduced from a leading end portion to a trailing end portion of said blade, each cutting edge having a cutting angle at said leading portion of said saw blade in the range of 16° to 17°, a cutting angle at an intermediate portion thereof in the range of 12° to 13°, and a cutting angle at said trailing portion thereof in the rainge of 8° to 9°, a truncated, rearwardly tapered tip edge traversing the full width of each saw tooth having an angle on the order of 30°, a ridge line formed between each said tip edge and said cutting edge, said ridge line being on the order of 40° to 45°, said tip edge joining each cutting edge and back edge, and the included angle between said back edge and said ridge line being less than the included angle between said cutting edge and said ridge line.

## 4,590,838
## ELECTRONIC MUSICAL INSTRUMENT

Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 320,768, Nov. 13, 1981, abandoned, which is a division of Ser. No. 215,024, Dec. 10, 1980, abandoned, which is a continuation of Ser. No. 20,749, Mar. 15, 1979, abandoned. This application Mar. 1, 1985, Ser. No. 706,904
Claims priority, application Japan, Mar. 18, 1978, 53-31369; Apr. 17, 1978, 53-45528; Apr. 20, 1978, 53-46836; Jun. 13, 1978, 53-71064
Int. Cl.[4] G10H *1/00*
U.S. Cl. 84—1.01 4 Claims




1. An electronic musical instrument, comprising:

a single key board having a plurality of performance keys;

means coupled to said single keyboard for detecting a single operated performance key to generate a key code data corresponding thereto;

musical sound generating means including a plurality of tone generating channels, each channel for producing a musical tone signal, said channels being switchable on the basis of a time division process whereby said musical sound generating means can simultaneously produce a plurality of musical tone signals;

channel assigning means coupled to said musical sound generating means for assigning the respective tone generating channels to a musical note to be produced in response to said generated key code data corresponding to said single detected operated performance key, said channel assigning means assigned at least two of said tone generating channels to the same note to be produced responsive to operation of a single performance key of said single keyboard;

said musical sound generating means including a memory for assigning a musical note to respective time division tone generating channels, said memory having memory areas which correspond in number to the number of said tone generating channels, and said channel assigning means being operative to assign at least two of said memory areas to the same note to be produced in accordance with a relationship between the memory areas and the tone generating channels;

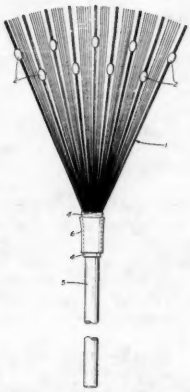
control means coupled to said musical sound generating means and to said channel assigning means for controlling at least two tone generating channels assigned to the same musical tone so as to produce different musical sound wave signals corresponding to the same note in each of said at least two tone generating channels, whereby an ensemble performance of at least two sounds are carried out responsive to inputting of a single key code data by said keyboard.

4,590,839

## PELLET DRUM STICK BRUSH

Robert W. Liedtke, 2110 8th Street North, St. Petersburg, Fla. 33713, and Gerald R. Liedtke, 600 B Objibway Ave., Houghton Lake, Mich. 48629

Filed Aug. 19, 1985, Ser. No. 767,188
Int. Cl.[4] G10D *13/00*
U.S. Cl. 84—422 S 10 Claims



1. A drum brush percussion device comprising:
(a) a handle;
(b) a first plurality of wire bristles;
(c) a second plurality of wire bristles having proximal and distal ends and having protuberance means disposed between said proximal and distal ends at predetermined locations, the locations of said protuberance means being spaced from the distal ends of the majority of said wire bristles sufficient to allow the brush effect but not so far as to preclude striking the drumhead with the protuberance means.

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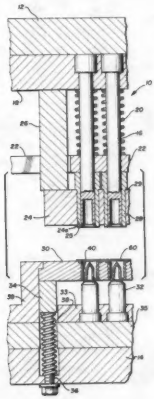
4,590,840

## FLASH HOLE CLOSURE FOR PRIMER BATTERY CUPS

Richard W. Proulx, Forest Lake, and Stephen J. Kent, Anoka, both of Minn., assignors to Federal Cartridge Corporation, Minneapolis, Minn.

Filed Nov. 9, 1984, Ser. No. 669,775
Int. Cl.[4] F42B *5/02, 9/02*
U.S. Cl. 86—10 16 Claims

1. An apparatus for covering flash holes formed in the closed end of a tubular primer battery cup open at the other end, said tubular primer battery cup having an anvil integral with the closed cup end and extending outwardly therewithin so as to present a centrally disposed pointed end adjacent the open end of the battery cup, the apparatus comprising:
(a) tooling means including a cutting die plate having a circular cutting opening therein with a cutting edge substantially equal in diameter to the external diameter of the rim of the battery cup, a stripper bushing axially slidable within said dieplate opening and having external diameter substantially equal to the external diameter of the rim of the battery cup to cooperate therewith in holding a covering means therebetween as the battery cup rim is moved into said die plate opening and a tubular foiling pin axially slidable within said bushing and having an external diameter less than the internal diameter of such a battery cup and an internal diameter greater than the outside diameter of an anvil of such a battery cup and constructed and arranged to be controllably moved vertically such that said pin may function in telescoping cooperation with such a battery cup anvil to thereby pierce a disk with the latter and move the disk into covering relation with the flash holes in the battery cup;
(b) carrier means for transporting such a primer battery cup to a position directly opposite said tooling means with its open end facing and aligned with said cutting opening; and
(c) covering means positioned between said tooling means and said carrier means whereby the vertical movement of said tooling means will cause said cutting die plate and



such a battery cup rim to cooperatively punch an imperforate disk equal in diameter to the external diameter of the battery cup rim from said covering means, and said foiling pin to carry the punched, imperforate disk portion of said covering means into the battery cup to said anvil point where it will be pierced solely by said anvil point, and pressed into the open end of the battery cup and seated at its closed end due to the vertical movement of said tooling means.

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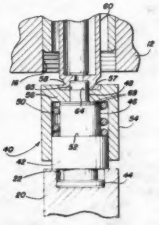
4,590,841

## APPARATUS FOR PRIMING CARTRIDGES

Gregory G. Davis, 1630 W. Cris Ave., Anaheim, Calif. 92802

Filed Jan. 7, 1985, Ser. No. 689,067
Int. Cl.[4] F42B *33/04, 33/10*
U.S. Cl. 86—36 4 Claims



1. A precision primer-reloading assembly which is mounted to and operated by a cartridge-reloading press, wherein the precision primer assembly comprises:
an adjustable support body mounted on the frame of a cartridge-reloading press;
a ram rod secured to said support body and depending downwardly therefrom;

means for adjustably mounting said support body to said frame;

a primer-guide assembly adapted to be mounted to a press ram which is operably mounted in said frame; said primer-guide assembly including:

a guide-base member having means formed on one end thereof for attaching said primer-guide assembly to said press ram;

a primer-guide pin formed on the opposite end of said guide-base member and adapted to engage and guide a primer into the primer pocket of a cartridge;

a housing guide formed to be slidably positioned over said guide base, said housing guide being defined by a tubular member having a closed end, said closed end including a centrally disposed hole formed therein to receive said primer-guide pin;

means formed in said housing guide to support said cartridge in a vertical position, said cartridge-support means comprising an annular recess formed in said closed end and aligned with said hold disposed therein, whereby the primer head of said cartridge is received in said recess and said primer pocket is aligned with said hole and said primer;

means for selectively positioning said primer in said primer pocket, said selective positioning means being located between said housing guide and said guide-base member, said selective-positioning means comprising at least one annular shim member located around said guide pin; and

biasing means interposed between said guide-base member and said housing guide.

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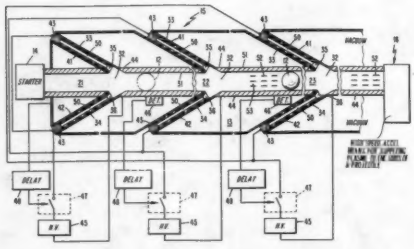
**4,590,842**

## METHOD OF AND APPARATUS FOR ACCELERATING A PROJECTILE

**Yeshayahu S. A. Goldstein, Gaithersburg, and Derek A. Tidman, Silver Spring, both of Md., assignors to GT-Devices, Alexandria, Va.**

**Filed Mar. 1, 1983, Ser. No. 471,215**
**Int. Cl.[4] F41F *1/00***
**U.S. Cl. 89—8** **41 Claims**



**1.** Apparatus for accelerating a projectile comprising means forming a confined path having a longitudinal axis along which the projectile traverses, and means for supplying a pulsed high pressure, high velocity plasma jet to the path from outside the path and to the rear of the projectile as the projectile traverses the path to accelerate the projectile along the path, the jet entering the confined path at a non-zero acute angle relative to the confined path axis, the projectile and confined path geometries being such that the plasma to the rear of the projectile has a tendency to leak around the projectile so the leaked plasma is in front of the projectile, the plasma in front of the projectile tending to accumulate and to impede the acceleration of the projectile, and means for venting the plasma in front of the projectile from the confined path to substantially overcome the tendency of the leaked plasma to accumulate and impede the projectile acceleration.

**3.** Apparatus for accelerating a projectile comprising means forming a confined path having a longitudinal axis along which the projectile traverses, and means for supplying a pulsed high pressure, high velocity plasma jet to the path from outside the path and to the rear of the projectile as the projectile traverses the path to accelerate the projectile along the path, the jet entering the confined path at a non-zero acute angle relative to the confined path axis, the means for supplying a pulsed high pressure, high velocity plasma jet to the path including a tube having an interior wall forming a capillary passage, means for applying a discharge voltage between spaced regions along the length of the interior wall while a dielectric ionizable substance is between the regions, the dielectric substance including at least one element that is ionized to form a plasma in response to the discharge voltage being applied between the spaced regions, the diametric length across the passage being short relative to the distance between the spaced regions, first and second ends of the passage being respectively open and blocked while the discharge voltage is applied between the spaced regions to respectively enable and prevent the flow of plasma through them, the plasma forming an electric discharge channel between the spaced regions while the discharge voltage is applied between the regions, ohmic dissipation occurring in the electric discharge channel in response to the discharge voltage being applied between the regions to produce a high pressure in the passage to cause the plasma in the passage to flow longitudinally in the passage and through the first end to form the pulsed plasma jet.

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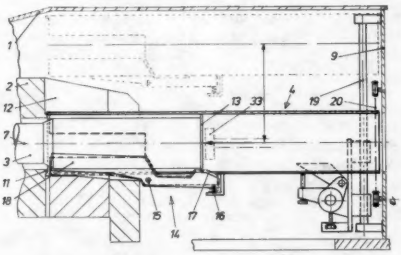
**4,590,843**

## LOADING RAMP FOR CARTRIDGES INTERSTAGED BETWEEN A MAGAZINE AND A GUN

**Wolfgang Huber, Augsburg, Fed. Rep. of Germany, assignor to KUKA Wehrtechnik GmbH, Fed. Rep. of Germany**

**Filed Aug. 19, 1981, Ser. No. 295,601**
**Claims priority, application Fed. Rep. of Germany, Aug. 19, 1980, 3031204**
**Int. Cl.[4] F41D *10/38*; F41F *9/00***
**U.S. Cl. 89—45** **6 Claims**



**1.** A loading ramp apparatus for cartridges to be supplied from a magazine to a gun of an armored vehicle turret, the gun having a bore with a bore axis and the cartridges having a base flange, the loading ramp apparatus comprising a ramp member defining a path of travel for a cartridge from the magazine to the gun bore, a rocker pivotally mounted to the ramp member on a pivot axis which extends perpendicularly to the bore axis, said rocker being mounted on said ramp member near an end of said ramp member adjacent the gun and at a bottom of said ramp member, said rocker having a first rocker lever adjacent said end of said ramp member and near the gun, and a second rocker lever spaced away from said end of said ramp member and spaced away from the gun, said second rocker lever having a stopping cam thereon, a spring engaged with said rocker for biasing said stopping cam into said path of travel to an extent, said first and second rocker levers extending from said pivot axis in substantially opposite directions, and said first rocket lever being substantially out of said path of travel when said stopping cam is extending into said path of travel, so that,

with a cartridge moving on said path of travel, a base flange of the cartridge engages said stopping cam and pivots said rocker against the biasing of said spring to move said stopping cam away from said path of travel and to move said first rocker lever toward said path of travel whereby said first rocker lever raises a forward end of a cartridge when the base flange of the cartridge engages said stopping cam, said stopping cam and said first rocker lever being shaped so that with a base flange of a cartridge engaged with said stopping cam said first rocker lever centers a cartridge with the bore axis.

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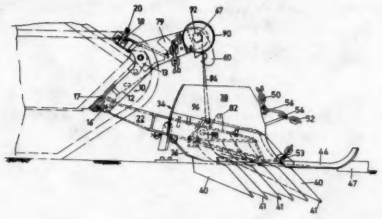
**4,590,844**

## MINE-FIELD CLEARING APPARATUS

**Simcha Bar-Nefy, Omer, and Michael Tiomkin, Beersheva, both of Israel, assignors to Israel Aircraft Industries, Ltd., Lod, Israel**

**Filed Nov. 23, 1983, Ser. No. 554,639**
**Claims priority, application Israel, Dec. 9, 1982, 67438**
**Int. Cl.[4] F41H** *11/12*
**U.S. Cl. 89—1.13** **3 Claims**



1. Apparatus for clearing mines comprising:

a frame mountable onto a vehicle for selectable positioning in a raised or lowered orientation;

means, mounted onto said frame, for raising and shunting aside mines; and

means for selectably retaining said frame in a raised orientation and including plow raising means operable from inside said vehicle for raising said raising and shunting means from its lowered orientation to its raised orientation;

said selectably retaining means including:

a hook member pivotably mounted onto said vehicle at a central location on said hook member and having a roller engaging slot in a first end thereof;

an intermediate member pivotably coupled to said hook member at a second end thereof opposite to the first end with respect to the central location;

an operating lever of elongate configuration, pivotably mounted at a first intermediate location therealong onto the vehicle and pivotably attached to said intermediate member at a second intermediate location along the operating lever;

electrically operated displacement means disposed in contacting relationship with a first end of the operating lever adjacent said first intermediate location therealong; and

a spring connection between the intermediate location adjacent its attachment to the operating lever and a fixed location with respect to said vehicle;

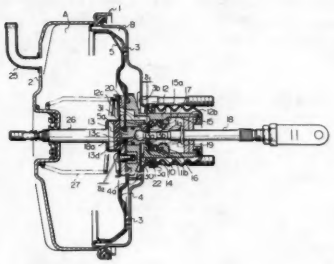
said selectably retaining apparatus being operative to move from a roller retraining orientation to a roller releasing orientation as the second intermediate location crosses the line connecting the pivot mounting of the first intermediate location of the operating lever and the pivot mounting at the second end of the hook member.

**4,590,845**

## PNEUMATIC SERVO BOOSTER

**Kiyoshi Tateoka, Kanagawa, and Hiromi Ando, Tokyo, both of Japan, assignors to Tokico Ltd., Kanagawa, Japan**

**Filed Dec. 8, 1980, Ser. No. 214,433**
**Claims priority, application Japan, Dec. 14, 1979, 54-173133[U]**
**Int. Cl.[4] F15B** *9/10*
**U.S. Cl. 91—369 A** **1 Claim**



1. In a pneumatic servo booster of the type including a housing, a movable wall partitioning the interior of said housing into two chambers, a valve body connected to said movable wall, and a valve mechanism including a poppet valve, a valve seat formed on said valve body and another valve seat formed on a plunger which is slidably fitted in said valve body, said valve mechanism communicating said two chambers when said poppet valve is spaced from said valve seat on said valve body and engages with said valve seat on said plunger, and said valve mechanism intercepting communication between said two chambers when said poppet valve engages with said valve seat on said valve body and is separated from said valve seat on said plunger, the improvement comprising:

return movement restricting means for restricting directly the extent of return movement of said plunger with respect to said housing when said valve body returns to its return position during return movement of said valve mechanism to said non-actuated position of the servo booster, said return movement restricting means comprises a member which, when said servo booster is in said non-actuated position, has a first surface axially abutting said plunger and a second surface axially abutting a surface of said housing, thereby axially positioning said plunger with respect to said housing, said member comprising a portion extending through a radial passage in said valve body, and said passage partially providing communication between said two chambers when the servo booster is in said non-actuated position.

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**4,590,846**

## PISTON AND CYLINDER ACTUATOR

**Kurt Stoll, Lenzhalde 72, 7300 Esslingen, Fed. Rep. of Germany**

**Filed Mar. 8, 1985, Ser. No. 709,444**
**Claims priority, application Fed. Rep. of Germany, Mar. 9, 1984, 3408607**
**Int. Cl.[4] F01B** *7/16*
**U.S. Cl. 92—151** **20 Claims**

1. A piston and cylinder actuator comprising:

a cylinder means which is closed at one end,

a piston means able to be acted upon by driving fluid in at least one axial direction for causing axial reciprocating motion of the piston,

a fluid connection for supply of fluid to act on said piston means in said direction,

a central piston rod means adapted to protrude from said

cylinder means, when said piston is moved by said fluid in a working stroke,

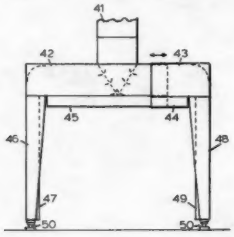
said actuator being made up of individual modular cells connected in line axially,

each such cell having

a cylinder with two, mutually opposite end walls,

a piston

and a piston rod extending from both sides of said piston, said cylinder end walls each having a central hole in which two ends of said piston rod are slidingly mounted, and in the case of any two such cells placed adjacently to each other the piston rods thereof abut




each other, said cylinders each having a cylindrical wall with an axial hole therein, the axial holes of said cells being aligned in the axially assembled condition of the cells to form a single duct running the length of the actuator, one of said cells having a inlet port for connection of said axial hole thereof with an exterior connection, each cell having a port forming a connection between the axial hole thereof with a piston driving space on one side of the piston of the cell, said axial holes of said cells opening at ends thereof at the same positions for connection of the axial holes together in the assembled condition of the cell with end faces of the cells adjoining each other.

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**4,590,847**

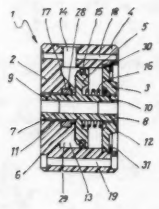
## SUPPLY MAKE-UP AIR ATTACHMENT FOR EXHAUST BOOTHS

**Francis R. Hull, 23-03 45th Rd., Long Island City, N.Y. 11101**

**Continuation-in-part of Ser. No. 437,499, Dec. 29, 1982, abandoned. This application Oct. 24, 1984, Ser. No. 664,204**

**Int. Cl.[4] B08B** *15/02*

**U.S. Cl. 98—115.3** **8 Claims**




**5**. A combination exhaust booth and air supply conduit attachment comprising: an open front work enclosure with a bottom working surface together with confining top, rear and sidewalls, a frame defining a frontal access opening opposite said rear wall, atmospheric exhaust conduit communicating with the interior of said work enclosure opposite said frontal access opening, and an exhaust fan disposed in said exhaust conduit to accelerate passage of an air stream through said work enclosure from said frontal access opening to the outlet of said atmospheric exhaust conduit; an air supply conduit attachment comprising: an elongate conduit header disposed adjacent the top edge of said frontal access opening; said elongate conduit header having a supply inlet, discharge outlets at opposite ends thereof, and an integral linear outlet nozzle along its length between said discharge outlets; said integral linear outlet nozzle of said elongate conduit header disposed linearly adjacent the top edge of said frontal access opening to discharge downwardly into said work enclosure; first and second linear outlet nozzles connected to and supplied from said opposite discharge outlets of said elongate conduit header; said first and second linear outlet nozzles being separately disposed linearly adjacent opposite side edges of said frontal access opening to discharge into said work enclosure; a supply conduit having an inlet exterior to said work enclosure, said supply conduit communicating with said elongate conduit header; and a supply fan disposed in said supply conduit for supplying pressurized outside air thereto; whereby exterior outside air is supplied to said elongate conduit header and discharged from said integral linear outlet nozzle and from said first and second linear outlet nozzles to form separate air curtain energy barriers flowing across said frontal access opening from different directions into said work enclosure, thereby containing air pollutants within said work enclosure and reducing the quantity of interior building air which flows into the said frontal access opening of said work enclosure.

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**4,590,848**

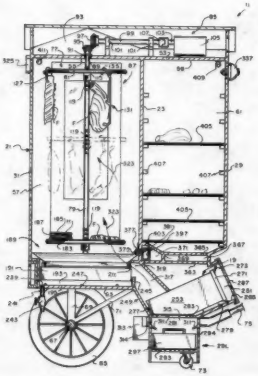
## COOKER

**John H. Willingham, 6189 Heather, Memphis, Tenn. 38119**

**Filed May 30, 1984, Ser. No. 615,294**

**Int. Cl.[4] A47J** *37/04*

**U.S. Cl. 99—339** **6 Claims**



**1**. A cooker comprising:

(a) a cooking tower including a cooking chamber in the interior thereof;

(b) heat source means communicated with said cooking chamber for introducing heat into said cooking chamber, said heat source means being located to one side of said cooking chamber;

(c) exhaust means communicating said cooking chamber with the outside atmosphere for exhausting the heat from said cooking chamber; and

(d) conveying means for conveying the food in said cooking chamber while being cooked; said conveying means including shaft means rotatably mounted and extending vertically in said cooking tower, carrousel means mounted on said shaft means for rotation therewith and holding means supported from said shaft means for holding the food to be cooked; said holding means including a rack means for holding a split animal while being cooked and

being removably hung from said shaft means, said rack means including an angle member for engaging said shaft means along a portion of the length thereof, framework means attached to said angle member for extending up into the inside of the split animal carcass, attachment means for attaching the animal to said framework means including socket means fixed to said framework and skewer means for extending through the animal carcass and into said socket means to pin the animal to said framework.

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**4,590,849**

## BREAD TOASTER

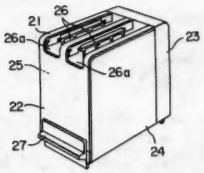
**Kichinosuke Uemura, Ibaraki, and Yukio Yamaguchi, Osaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka and Toyo Press Co., Ltd., Itami, both of, Japan**

**Filed Sep. 13, 1984, Ser. No. 650,067**

**Claims priority, application Japan, Sep. 19, 1983, 58-172476; Sep. 19, 1983, 58-172478; Sep. 22, 1983, 58-175462; Sep. 26, 1983, 58-177360; Sep. 26, 1983, 58-177361**

**Int. Cl.[4] A47J** *37/08*

**U.S. Cl. 99—331** **3 Claims**




1. A bread toaster, comprising:

an outer housing having a toasting chamber therein and including

a top panel, said top panel having at least one bread receiving slot formed therein;

an outer shell panel extending downwardly from a first edge of said top pane, said outer shell panel having at least one notch formed therein, said notch connecting with said bread receiving slot and extending downwardly from said top panel for a distance equal to less than half the total height of said outer shell panel; and

a cover extending downwardly from a second edge of said top panel opposite said first edge and substantially parallel to said outer shell panel;

pivot bearing means mounted on an inner lower portion of said outer shell panel below said notch;

at least one bread support disposed below said bread receiving slot, said bread support having a first end pivotally mounted on said pivot bearing means, and a second end;

toasting heaters positioned vertically within said toasting chamber and displaced laterally from said bread support; and

at least one bread support guard member disposed in the vicinity of said pivot bearing means so as to operate in relation to the pivotal movement of said bread support, said bread support guard member having tapered side edges and a recess defined by said tapered side edges, which side edges converge towards the bottom of said recess, whereby a bread slice to be toasted is positioned at the mid-position between two toasting heaters.



**4,590,850**

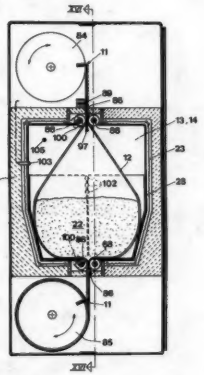
## APPARATUS FOR AUTOMATICALLY MAKING OF FOOD PRODUCTS SUCH AS BREAD, CAKES AND THE LIKE

**Gunnar Hedenberg, Grundsund, Sweden, assignor to Heden Team A.G., Triesenberg, Liechtenstein**

**Continuation-in-part of Ser. No. 565,398, Dec. 27, 1983, Pat. No. 4,550,654, which is a continuation-in-part of Ser. No. 481,154, Apr. 1, 1983, Pat. No. 4,550,653. This application Jan. 4, 1985, Ser. No. 688,983**

**Int. Cl.[4] A47J** *27/62, 37/01*

**U.S. Cl. 99—348** **8 Claims**




1. Apparatus for automatically making food products in piece form from dough-like substances comprising: a housing containing holding means adapted to be affixed to either end of a flexible sealable bag containing the ingredients for the dough-like substance and a dough preparation station having a slit at the top and bottom portions thereof forming upper and lower slit openings respectively; kneading means for mechanically working the ingredients in said bag, said kneading means including the holding means and slit openings at each end of said bag, the bag adapted to be attached to the holding means and pass through the slit openings, and means for creating relative oscillating movement between the bag and the slit openings so that the ingredients are kneaded into a dough-like substance; and a heat treating station in said housing whereby the kneaded dough-like substance is treated; said slit openings each defined by two rollers, at least one of the rollers of at least the upper slit opening being moveable relative to the other roller in that pair so as to allow gas to escape from the bag at the desired time.

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**4,590,851**

## APPARATUS FOR PROCESSING FROZEN COMESTIBLES

**David Mayer, Scarsdale, N.Y., assignor to Orange Julius International, Inc., New York, N.Y.**

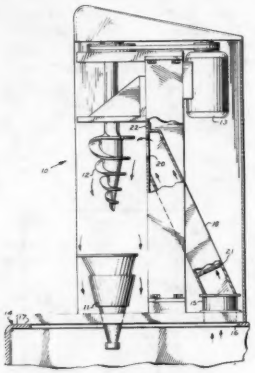
**Filed Oct. 31, 1983, Ser. No. 547,331**

**Int. Cl.[4] A23G** *9/02, 9/04*

**U.S. Cl. 99—455** **5 Claims**

1. Apparatus for processing a frozen comestible said apparatus including a base; a housing; a receptacle for carrying said frozen comestible; and auger for rotatable engagement with said comestible while said comestible is carried by said receptacle; said housing adapted to be supported at its base atop an opening in a freezer chest; and opening in said base; said opening adapted to the free flow of freezer chest air about said receptacle, and air circulation means, said air circulation means

including a duct and a fan, said duct open at one end to said freezer chest and at its other end opening adjacent said auger,



whereby the operation of said fan circulates cold air from the freezer chest about said auger and said receptacle.

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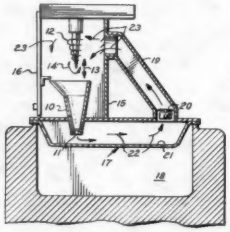
**4,590,852**

**COOLING SYSTEM FOR APPARATUS FOR PROCESSING FROZEN COMESTIBLES**

**David Mayer, Scarsdale, N.Y., and James F. Hall, Jr., Ardsley, Pa., assignors to Orange Julius International Inc., New York, N.Y.**

**Filed Feb. 28, 1984, Ser. No. 584,528**
**Int. Cl.[4] A23G** *9/02, 9/12*
**U.S. Cl. 99—455** **4 Claims**



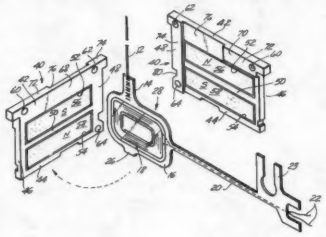
1. Apparatus for processing a frozen comestible said apparatus including a base; a housing; a receptacle for carrying said frozen comestible; an auger for rotatable engagement with said comestible while said comestible is carried by said receptacle; said housing adapted to be supported at its base atop an opening in a freezer chest; an opening in said base; said opening adapted to the free flow of air about said receptacle; air circulation means, said air circulation means including a duct and a fan, said duct open at one end through said base and at its other end opening adjacent said auger, and a pan interposed between said base and said freezer, substantially covering said freezer opening, said pan adapted to act as a heat exchanger, whereby the operation of said fan circulates cold air about said auger and said receptacle.

**4,590,853**

**MODULAR PRINT HEAD**

**Richard C. Nickels, Jr., Hampstead, and Richard L. Allgaier, Jr., Reisterstown, both of Md., assignors to General Instrument Corporation, New York, N.Y.**

**Filed Apr. 23, 1984, Ser. No. 602,817**
**Int. Cl.[4] B41J** *3/10*
**U.S. Cl. 101—93.48** **6 Claims**



1. A print head for use in a dot matrix printer comprising support members, a plurality of individual non-magnetic frames having opposite faces one of which carries a projecting part and having mounting holes through which said support members extend, said frames being stacked on said support members with one face of one adjacent frame engaging the projecting part of the other adjacent frame, each of said frames having an aperture therethrough between said opposite faces thereof within which a magnet is mounted so as to be exposed at said opposite faces, said magnets in said plurality of frames being similarly magnetically oriented when said frames are stacked on said support members, said projecting parts defining frame portions thicker than the depth of said apertures, thereby to produce spaces between the magnets of adjacent frames when said frames are stacked in engagement with adjacent frames, hammers comprising coils movably received in said spaces, said hammers further comprising print means movable with said coils and freely movably extending from said frames to points beyond said frames, and means for making electrical connection with said coils.

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**4,590,854**

**SCREEN PRINTING METHOD AND APPARATUS**

**Ronald C. Anderson, 1315 Avon Dr., Connellsville, Pa. 15425**

**Filed Apr. 6, 1984, Ser. No. 597,503**
**Int. Cl.[4] B41F** *17/08, 17/38, 15/40;* **B41L** *13/18*
**U.S. Cl. 101—35** **20 Claims**

1. A method of printing indicia on successive substrates comprising:

(a) providing a pattern on a screen of a housing forming a gas chamber, said pattern corresponding to the indicia to be printed;

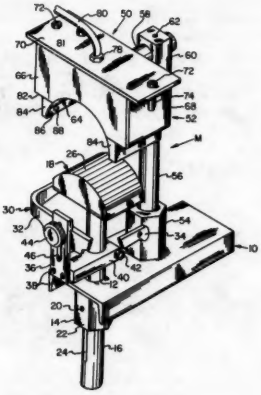
(b) providing a mass of ink in the form of a viscous composition on one surface of the screen within the housing;

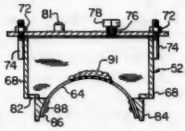
(c) contacting a substrate to be printed to the opposite surface of the screen;

(d) providing a constant gas pressure to said ink within said gas chamber;

(e) forcing ink from said ink mass under said constant gas pressure for a predetermined time through said screen

pattern and onto said substrate to directly print said indicia on said substrate;





(f) the pressure in said chamber being maintained at substantially the constant gas pressure between the printing of successive substrates.

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**4,590,855**

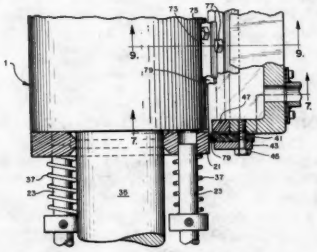
## REVERSE ANGLE DOCTOR BLADE ASSEMBLY WITH STATIONARY END SEAL

**David L. Schommer, and Wayne LaValliere, both of Pulaski, Wis., assignors to Printco Industries, Ltd., Pulaski, Wis.**

**Filed Jun. 18, 1984, Ser. No. 621,498**

**Int. Cl.[4] B41F** *9/10, 31/04, 31/06*

**U.S. Cl. 101—157** **29 Claims**



**1.** A liquid transfer apparatus, comprising:

reservoir means having ends and intermediate walls defining a reservoir cavity for holding liquid;

transfer roll means having ends mounted for rotation about an axis and having a transfer surface intermediate said ends for rotating to retain a metered quantity of said liquid;

means for engaging said transfer roll means within said reservoir cavity and rotating said transfer roll means about said axis so that said transfer surface retains liquid from said reservoir cavity;

end seal support means mounted in stationary, slidable relation to the ends of said transfer roll means and having a sealing surface portion coplanar with an adjacent abutting portion of said transfer surface;;

end seal means for sealing the ends of said reservoir means and having a sealing edge conforming to said sealing surface portion of said end seal support means for engaging said sealing surface portion to provide a stationary seal at the ends of said transfer roll means;

at least one doctor blade means having an edge for removing excess liquid adhering to said transfer surface as said transfer roll means rotates; and

means for supporting said doctor blade means adjacent to and extending along the length of the transfer roll means with the ends of the doctor blade means in sealing engagement with at least a portion of said end seal means and said edge of the doctor blade means extending over said transfer surface.

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**4,590,856**

## LIFTER-TYPE INKER FOR ROTARY PRINTING MACHINE INCLUDING ROTATIONAL SHOCK DAMPENING MEANS

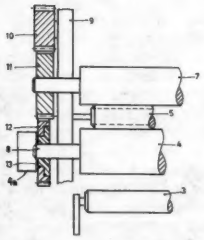
**Hans Mamberer, Königsbrunn; Reinhard Zeller, Augsburg, and Otto Spang, Margertshausen, all of Fed. Rep. of Germany, assignors to M.A.N.-Roland Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany**

**Filed Nov. 26, 1984, Ser. No. 674,737**

**Claims priority, application Fed. Rep. of Germany, Nov. 26, 1983, 3342877**

**Int. Cl.[4] B41F** *31/06, 31/10, 31/14*

**U.S. Cl. 101—350** **14 Claims**



**1.** Lifter-type inker, for a rotary printing machine driving certain rollers therein at a machine speed, having

an ink supply roller (**2**) rotating slowly relative to said machine speed;

a reciprocating lifter roller (**3**) alternately contacting said relatively slowly rotating ink supply roller (**2**) and a more quickly rotating first ink milling and distribution roller (**4**);

the first ink milling and distributing roller (**4**) having a hard surface;

a second ink milling and distributing roller (**7**) having a hard surface;

a transfer roller (**5**), having a soft surface (**6**), located be-

tween said first and second milling and distributing rollers (4, 7) and transferring ink from the first milling and distributing roller (4) to the second milling and distributing roller (7);

a drive means (10) driving said second milling and distributing roller (7) at machine speed;

a rotary-elastic coupling (13) and

means for dampening rotational shock or oscillations caused by initial contact of said reciprocating lifter roller (3) with said first milling and distributing roller (4) and substantially preventing said shock from being transmitted to other rollers in said rotary printing machine, thereby causing imperfect printing,

wherein said means for dampening rotational shock comprises an elastic drive connection (6, 13) comprising said soft surface of said transfer roller and said rotary-elastic coupling between the first milling and distributing roller (4) and said drive means (10).

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**4,590,857**

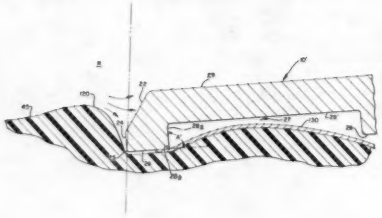
## INK METERING APPARATUS

**Harold P. Dahlgren, 726 Regal Row, Dallas, Tex. 75247**

**Continuation of Ser. No. 649,968, Sep. 12, 1984, abandoned, which is a continuation of Ser. No. 345,726, Feb. 4, 1982, abandoned, which is a continuation of Ser. No. 142,595, Apr. 22, 1980, abandoned, which is a continuation of Ser. No. 906,471, May 17, 1978, abandoned, which is a division of Ser. No. 779,647, Mar. 21, 1977, abandoned. This application Aug. 23, 1985, Ser. No. 768,921**

**Int. Cl.[4] B41F *31/04;* B41L *27/08***

**U.S. Cl. 101—350** **8 Claims**



1. An inker for a printing press comprising: a resilient roller; a hard, generally flat, elongated metallic metering strip having an upper surface and a lower surface; a side surface on the metering strip extending between and intersecting said upper and lower surfaces, a portion of said side surface and a portion of said lower surface adjacent said side surface being polished such that said side surface and said portion of the lower surface intersect at an included angle greater than 90° at an apex to form a straight, polished, first metering edge on a polished metering surface, the lower surface of said elongated strip having a relieved area formed therein, said relieved area having a depth of at least 0.020 inch to leave a resilient metallic portion on said strip between the upper surface of the strip and the relieved area of approximately 0.030 inch and having a polished surface bounding the relieved area in the lower surface on the opposite side of the polished portion of the lower surface from the first metering edge, said polished surface bounding the relieved area in the lower surface being inclined relative to a projection of the plane of said polished portion of the lower surface at an angle of at least 30° to form a second polished edge spaced from said first metering edge; support means for supporting said metering strip cantilever fashion to position said metering strip generally tangent to and in pressure indented relation with said resilient roller, said recessed area in said metering strip being formed to prevent engagement of the metering strip with a metering film of ink on the resilient roller except by the portion of the metering strip lying between the first and second polished edges.

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**4,590,858**

## MECHANISM FOR THE CONTROL OF THE INKER UNIT ON ACCESSORY DEVICES OF PRINTING MACHINES

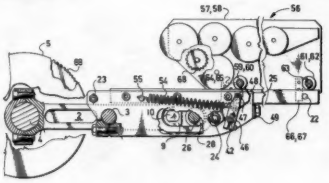
**Vaclav Sedlak, Jedovnice; Josef Jurny, Blansko, and Vaclav Luner, Habruvka, all of Czechoslovakia, assignors to ZVS Adamovske strojirny, koncernovy podnik, Adamov, Czechoslovakia**

**Filed Dec. 6, 1984, Ser. No. 678,654**

**Claims priority, application Czechoslovakia, Dec. 6, 1983, 9094-83**

**Int. Cl.[4] B41F *31/34;* B41L *27/36***

**U.S. Cl. 101—352** **6 Claims**



1. In combination, a printing mechanism having a frame, a driven printing roller mounted on the frame, and an inker unit of an accessory device for the printing mechanism supported on guiding members attached to the frame for selective reverse movement between the first, operative terminal position close to the printing roller and a second, inoperative terminal position, substantially spaced from the printing roller, said inker unit mounted on the accessory device for selective cooperation with the printing roller, a first gear drivingly connected to the printing roller, a second gear drivingly connected to the inker unit, the first and second gears being in meshing relationship when the inker unit of the accessory device is in its first terminal position and being out of meshing relationship when the inker unit of the accessory device is in its second terminal position, the frame of the printing mechanism including spaced parallel side walls, the driven printing roller being mounted between said side walls of the printing mechanism, the guiding members for supporting the inker unit of the accessory device being mounted upon the respective side walls of the printing mechanism, the second gear being mounted upon a drive shaft on the accessory device for the inker unit, the axis of said drive shaft being parallel to the axis of the printing roller, a transverse eccentric shaft mounted in the side walls of the printing machine, a transverse carrier shaft disposed between and mounted upon the side walls of the printing machine, spaced parallel connecting levers slidably arranged on the carrier shaft, carriers mounted upon the connecting levers, guides mounted upon the carriers, the accessory device including the inker unit being slidably mounted upon said guides, the connecting levers defining openings in which there are located slide pieces which are arranged on pivots affixed to the respective side walls of the printing machine.

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**4,590,859**

## METHOD OF PRINTING BY SENSING VARIABLE INDICIA TAG FORMAT LENGTH

**Frederick M. Pou, Dayton, and Richard L. Straub, Miamisburg, both of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio**

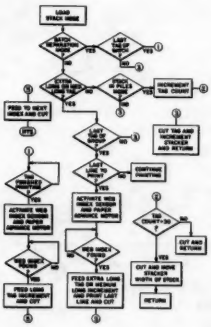
**Division of Ser. No. 393,674, Jun. 30, 1982, Pat. No. 4,442,774. This application Mar. 26, 1984, Ser. No. 575,941**

**Int. Cl.[4] B41F *13/56***

**U.S. Cl. 101—426** **36 Claims**

1. A method for controlling the operation of a tag printer which is adaptable to printing data according to a plurality of formats of the type that makes imprints onto a web of sheet stock having indices disposed thereon at predetermined intervals including the steps of storing data representative of the

data to be printed and the corresponding length of the tag on which the information is to be printed according to a predetermined format, sensing the indices as the web is fed through the



printer and terminating the operation if the tag length defined by the indices does not substantially correspond to the tag length defined by the stored data.

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**4,590,860**

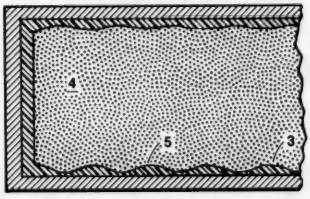
## CONSTANT PRESSURE END BURNING GAS GENERATOR

**Robert V. Kromrey, Campbell, Calif., assignor to United Technologies Corporation, Hartford, Conn.**

**Continuation of Ser. No. 286,924, Jul. 27, 1981, abandoned. This application Jan. 11, 1984, Ser. No. 569,817**

**Int. Cl.[4] C06D** *5/06*

**U.S. Cl. 102—289** **7 Claims**




1. A gas generator comprising a combustion chamber having gas outlet means and an end burning gas generator grain contained therein, said gas generator grain filling the cross section of a portion of the combustor and the grain in said portion being characterized by the length of its external surface being greater than its axial length in an amount sufficient to produce in the grain a substantially constant gas generating burn rate when ignited.

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**4,590,861**

## INSERT FOR A PROJECTILE-FORMING CHARGE

**Horst G. Büigiel, Bonn-Ippendorf, Fed. Rep. of Germany, assignor to Diehl GmbH & Co., Fed. Rep. of Germany**

**Filed May 2, 1984, Ser. No. 606,355**

**Claims priority, application Fed. Rep. of Germany, May 13, 1983, 3317352**

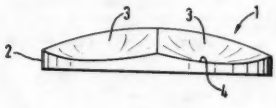
**Int. Cl.[4] F42B** *5/00*

**U.S. Cl. 102—501** **10 Claims**

1. A projectile-forming, explosive-charge insert comprising:

a spherically-curved, generally dish shaped insert body having a non-constant material thickness extending in the centripetal direction;

said insert body including mutually peripherally displaced, centripetally extending first zones each having a constant material thicknesses in the centripetal direction; and further centripetally extending second zones each having a




non-constant thickness alternating with and forming transitions with said first zones.

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**4,590,862**

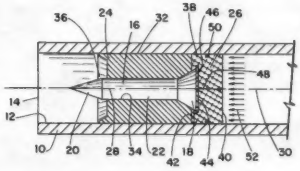
## PROJECTILE PUSHER-TYPE DISCARDING SABOT

**Chester Grabarek, Aberdeen, Md., and Dave L. Collis, Socorro, N. Mex., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed May 23, 1983, Ser. No. 497,448**

**Int. Cl.[4] F42B** *13/16*

**U.S. Cl. 102—522** **5 Claims**




1. A gun system including a gun barrel for launching single sub-caliber projectiles of varying caliber and geometrical design which have diameter significantly smaller tha the bore diameter of said gun barrel, including projectile positioning and pushing elements of such distinctive aerodynamic characteristics that the elements are incapable essentially of following the same flight trajectory as the projectile to avoid overstriking of a test target were said elements to strike the same target spot as the projectile, the said projectile being of the flare-stabilized type having a truncated conical tail portion and a cylindrical body said projectile positioning and pushing elements comprising a plastic polyproplux bore rider element arranged as a cylinder of diameter equal to the inside bore diameter of said gun, said bore rider having a hollowed out cavity arranged symmetrically coaxial with the longitudinal axis of said gun barrel of geometrical shape adapted to conform to and accept the contour of said projectile for holding said projectile therein, the bore rider not covering the front of the projectile leaving the projectile tip exposed, there being a recessed countersunk bore in the front of said bore rider subsantially across the full face of said bore rider, a pusher element arranged as an aluminum cylinder of diameter equal to the inside bore diameter of said gun, there being a recessed groove in the circumference of said pusher element to receive an obturator, said obturator adapted as a plastic ring and used to seal said pusher element against blow-by gases, there being a round recess at the front end of said pusher element adapted for receiving the aft end of said projectile; and a steel disc for absorbing shock, placed in said recess between said projectile aft end and said pusher element; said projectile being loaded into said bore rider cavity, and fired by expanding gases behind said pusher element, which element is positioned behind said bore rider and projectile combination; each of said bore rider, disc, and pusher elements being comprised of two sections which are formed by cutting them in a longitudinal plane which includes the common longitudinal axis of the said gun barrel and projectile; the said bore rider, disc, and pusher element sections not following the trajectory of said projectile

when launched because of unsymmetrical aerodynamic drag thereon as compared with that of said projectile.

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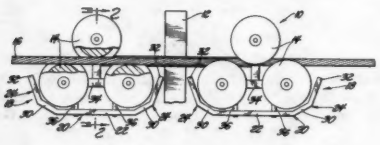
**4,590,863**

## SKI LIFT AND LUBRICANT TRAP ASSEMBLY

**Franklin R. Lozen, 34442 Jefferson Ave., Apt. 20, Mt. Clemens, Mich. 48045**

**Filed Dec. 30, 1983, Ser. No. 567,378**
**Int. Cl.[4] B61F** *19/06;* **F16N** *31/00*
**U.S. Cl. 104—133** **4 Claims**



1. A ski lift and trap assembly combination for collecting lubricant and other materials dispelled from a ski lift cable suspension assembly, said assembly comprising: a longitudinally moveable cable (16), a ski lift post assembly (12), at least three wheels (14) rotatably supported by said post assembly (12) with one of said wheels (14) being a top wheel engaging the top of said cable (16) and the other two wheels (14) being bottom wheels engaging the bottom of said cable (16) on opposite sides of the contact between said cable (16) and said top wheel, said longitudinally moveable cable (16) engaging said wheels (14) for guidance and support by said wheels (14), said wheels (14) being in rolling engagement with said cable (16), characterized by collection means (18) supported by said post assembly (12) in spaced relationship to said wheels (14) for collecting lubricant and other materials dispelled about said wheels (14), said collection means (18) including a trough (20) disposed below and spaced from said wheels (14), said trough (20) having a center portion (22) extending below said bottom wheels and said cable (16) and including end portions (24) extending upwardly from said center portion (22) and at least partially about the circumference of said bottom wheels.

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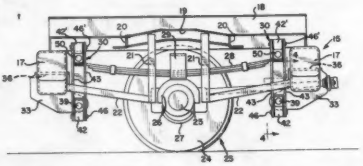
**4,590,864**

## SINGLE AXLE TRUCK SUSPENSION FOR RAILWAY FLAT CAR

**Phillip G. Przybylinski, Schererville, Ind., assignor to Pullman Standard Inc., Chicago, Ill.**

**Filed Nov. 18, 1983, Ser. No. 553,253**
**Int. Cl.[4] B61F** *5/00*
**U.S. Cl. 105—199 S** **14 Claims**



1. In a railway car suspension including a support structure adapted to be connected to the underframe of a rail car;
- said truck support structure including a horizontal frame structure provided at longitudinally spaced portions with laterally extending bolster structures;
- said bolster structures each comprising a pair of spaced upright walls and a top and and bottom wall connected to the upright walls;
- an axle retaining structure connected to said frame structure on opposite sides thereof and projecting downwardly with respect thereto;
- a leaf spring assembly including a pair of laterally spaced leaf springs positioned inwardly of and adjacent to said axle retaining structure;
- an axle and wheel assembly including spaced axle journals positioned to be engageable with said axle retaining structure for limited movement with respect thereto;
- said leaf spring assembly having intermediate
- portions thereof supported on said axle journals;
- hanger strap assemblies supporting opposite ends of said leaf spring assembly and projecting downwardly therefrom;
- said hanger strap assemblies having limited sideways movement;
- the improvement of a support bracket for each hanger strap assembly;
- said support brackets each including a lower pivot portion pivotally connected to lower portions of said hanger strap assemblies;
- said bolster structure upright walls having openings therein;
- and said support brackets each including a body portion extending through said openings and within said bolster structures, and being rigidly secured in said openings and within said bolster structures to allow clearance of the support brackets from the rails when a deep bolster structure is used with a low level underframe in the railway car.

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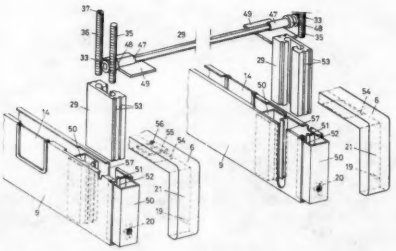
**4,590,865**

## FURNITURE PIECE WITH A TABLE TOP WHOSE HEIGHT AND/OR ANGLE OF TILT CAN BE ADJUSTED

**Wendolin Rütsche, and Urs Langenegger, both of Rüti, Switzerland, assignors to Embru-Werke, Mantel & CIA, Rüti, Switzerland**

**Filed Jan. 4, 1984, Ser. No. 568,038**
**Claims priority, application Switzerland, Jan. 18, 1983, 270/83**
**Int. Cl.[4] A47F** *5/12;* **F16H** *27/02;* **F16M** *13/00*
**U.S. Cl. 108—1** **6 Claims**



1. Piece of furniture with a stand comprising two hollow side pieces (1) and a hollow bracket (2) interconnecting the two side pieces (1), and with a table top (3) which is adjustable relative to the stand in height and/or inclination by an adjusting mechanism comprising:
- two identical spaced guide blocks (29) connected with the stand, the two blocks each having a vertical guide groove (32), the grooves facing each other, the guide groove (32) in each block (29) being undercut to both sides,
- two cogwheels (33) one each guided in a respective guide groove (32),
- an activating shaft (39,29) torsionally interconnecting the two cogwheels (33) and extending between the two blocks (29),
- a first threaded spindle (35) located in the undercut of one of

the blocks (29) and meshing with the respective cogwheel (33),

a second and a third threaded spindle (35,36) located in the undercut of the other block (29) on opposite sides of and meshing with the respective cogwheel (33), the third spindle (36) comprising means (37) for engagement by an activating crank (38), and

two elements (40,47) rotatably mounted on the activating shaft (29,39) and connected to the table top (3).

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4,590,866

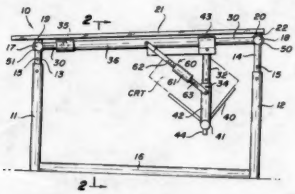
## WORK STATION WITH UNDERDESK DISPLAY

Edward C. Schairbaum, 3421 Stadium Dr., Fort Worth, Tex. 76109

Filed Feb. 16, 1984, Ser. No. 580,804

Int. Cl.[4] A47B *85/00, 81/06;* A47G *29/00;* G09B *7/00*

U.S. Cl. 108—23 16 Claims




1. A computer work station comprising a work table having a transparent generally horizontal work surface, a CRT, a keyboard movably associated with said CRT, and means to suspend said CRT beneath said transparent work surface with the screen of said CRT at an angle to said work surface so that the screen of the CRT is visible therethrough at a downward angle to a worker using the work station, and said means to suspend said CRT including means for moving said CRT to a variety of positions and angles beneath the transparent work surface whereby its display will be conveniently visible to said worker at many positions about the table.

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4,590,867

## PIN FOR HOLDING AND/OR COOLING OF CERAMIC COATINGS IN HOT REACTION CHAMBERS

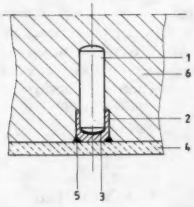
Klaus Köhnen, Mülheim, and Norbert Ullrich, Essen, both of Fed. Rep. of Germany, assignors to Krupp-Koppers GmbH, Essen, Fed. Rep. of Germany

Continuation of Ser. No. 572,922, Jan. 20, 1984, abandoned. This application Jun. 4, 1985, Ser. No. 741,259

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1983, 3304745

Int. Cl.[4] F23M *5/00*

U.S. Cl. 110—336 6 Claims




1. A hot reaction chamber, comprising a wall; a ceramic coating held on said wall in gapless surface contact therewith; and a pin for holding and cooling a ceramic coating, said pin including a pin shaft composed of a material which is temperature-, corrosion-, erosion- and oxidation-resistant in reaction conditions in a hot reaction chamber and extending into the interior of said ceramic coating; and a pin cap composed of a material corresponding to the material of a wall of the hot reaction chamber and arranged on said wall in gapless surface contact therewith, said pin shaft being fitted in said pin cap and connected with said pin cap in non-releasable form-locking manner in direct surface contact with the latter in a firm and heat-conductive manner so that the pin can, not only hold the ceramic coating, but also cool the ceramic coating.

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4,590,868

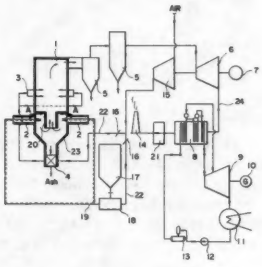
## COAL-FIRED COMBINED PLANT

Takao Ishihara, Tokyo, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1985, Ser. No. 704,374

Int. Cl.[4] F23D *1/00*

U.S. Cl. 110—347 3 Claims



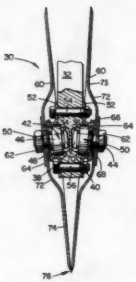

1. A coal-fired combined plant in which a finely powdered coal is carried to a combustion furnace by high-temperature and high-pressure air and is burned therein; the resultant combustion gas is delivered to a gas turbine, in order to generate electric power; by the utilization of the resultant exhaust gas, steam is produced; and electric power generation is carried out by a steam turbine with the aid of the produced steam, characterized in that high-temperature and high-pressure air and a finely powdered coal are introduced into coal ash-melting combustion furnaces, in which said finely powdered coal is burned at a high temperature to produce a combustion gas; most of the resultant coal ash is removed in a molten state from said combustion gas to carry out a primary dust removal; a dust in said combustion gas is removed therefrom by a cyclone disposed in a pressurizing coal combustion furnace to carry out a secondary dust removal; the removed dust is subjected to a heat exchange for secondary air in a dust cooler disposed on the lower portion of said pressurizing coal combustion furnace; a temperature of said combustion gas at an outlet of said pressurizing coal combustion furnace is adjusted to a predetermined level by mixing said combustion gas with said secondary air; the dust in said combustion gas discharged through the outlet of said pressurizing coal combustion furnace is removed therefrom by a precision dust-removing device in order to carry out a tertiary dust removal; and said combustion gas is then delivered to said gas turbine.

4,590,869

## DOUBLE DISK OPENER ASSEMBLY AND DISK BLADE THEREFOR

Ronald M. Steilen, Ankeny, Iowa, assignor to Deere & Company, Moline, Ill.

Continuation of Ser. No. 011,534, Feb. 12, 1979, abandoned.
This application Nov. 3, 1980, Ser. No. 203,184
The portion of the term of this patent subsequent to Apr. 8, 1997, has been disclaimed.
Int. Cl.[4] A01B *71/04, 15/16;* A01C *5/06*
U.S. Cl. 111—88 1 Claim



1. A double disk blade opener assembly comprising:

a cast seed boot having opposed outwardly facing sidewalls, each including a stepped bore defining an annular shoulder recessed inwardly from the sidewalls;

a pair of bearings, each having an inner race with a central aperture and an outer race concentric with the inner race, said outer race having axially inwardly and outwardly facing edges and said inner race including an outwardly facing surface axially outwardly of the outwardly facing edge, wherein the distance between the edges is greater than the distance between the sidewall and the shoulder;

a pair of clamp means, each releasably engaging the outwardly facing edge of the outer race of one of the bearings and non-rotatably positioning the inwardly facing edge against the shoulder with a major portion of the outer race extending outwardly beyond the sidewall;

a pair of shafts, each extending through one of the central apertures of the inner races for rotation therewith and including an axially extended end;

a pair of circular disk blades, each of unitary construction having a central circular cupped portion and a generally flat, radially outward portion forming a rounded junction with the cupped portion, said outward portion having an outer circumference defining a cutting edge, wherein the cupped portion has a central flattened area including a central shaft receiving aperture therein for receiving the axially extended end of one of the shafts therethrough with the cupped portion opening inwardly around the outwardly extending portion of the corresponding outer race; and

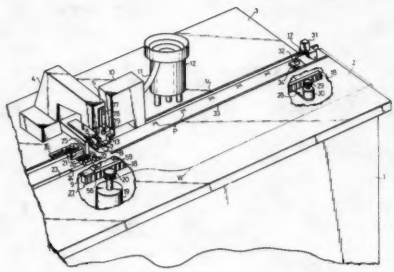
means clamping each disk blade on the corresponding shaft between the outwardly facing surface of the inner race and the axially extended end of the shaft for rotation with the shaft and the inner race.

4,590,870

## APPARATUS FOR CONTINUOUSLY FORMING STITCHES ON A PLURALITY OF SEWING PORTIONS

Hideo Kawaguchi; Hideo Ando, and Yasuhiko Watanabe, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Oct. 15, 1985, Ser. No. 787,239
Claims priority, application Japan, Oct. 17, 1984, 59-217691
Int. Cl.[4] D05B *3/04*
U.S. Cl. 112—70 12 Claims



1. A sewing apparatus for continuously forming stitches on a plurality of sewing portions comprising:

a work table;

a sewing machine adapted to sew buttons on a fabric workpiece on said work table or to form buttonhole stitches on said fabric workpiece;

fabric workpiece clamping means movable along the upper surface of said work table and capable of holding and releasing said fabric workpiece;

a feed driving mechanism adapted to bring said clamping means from a feed start position to a maximum feed position such as to bring a plurality of sewing portions of the fabric workpiece succesively to a reciprocating path of a needle of said sewing machine;

auxiliary fabric workpiece clamping means capable of holding and releasing said fabric workpiece on said work table independently of said fabric workpiece clamping means;

detecting means adapted for detecting a forward travel of said fabric workpiece clamping means from said feed start position to an instant position;

memory means for storing data concerning the number of said sewing portions and the intervals thereof; and

control means for controlling said fabric workpiece clamping means and said auxiliary fabric workpiece clamping means such that, when the sum of the forward travel of said fabric workpiece clamping means and the interval between successive sewing portions exceeds an allowed stroke of said fabric workpiece clamping means from the feed start position to the maximum feed position, said fabric workpiece clamping means once release said fabric workpiece and return from the instant position towards the feed start position while said auxiliary fabric workpiece clamping means hold said fabric workpiece and then hold said fabric workpiece again at a returned position thereof.

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4,590,871

## AUTOMATIC MAIN SEAM FEEDING AND FORMING APPARATUS

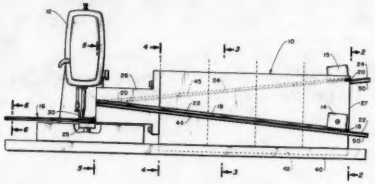
John M. Granville, 21922 Scallion Dr., Saugus, Calif. 91350

Filed May 2, 1985, Ser. No. 729,688
Int. Cl.[4] D05B *35/04*
U.S. Cl. 112—142 10 Claims

1. An automatic seam feeding and forming apparatus comprising:

a die block;

a pair of vertically spaced apart slots in said die block along opposite sides; said slots progressing through said die block at a depth providing a predetermined overlapping relationship from an entrance end to a nose end and pro-



gressively bending toward each other from approximately zero degrees to approximately one hundred and eighty degrees as said slot passes through said die block;

means progressively feeding fabric edges through said block whereby said fabric edges emerge from said nose end in an overfolded seam.

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**4,590,872**

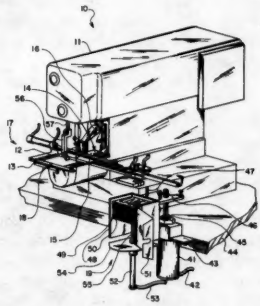
## AUTOMATIC LABEL EMPLACER AND DISPENSER FOR SEWING MACHINES

**Murel B. Bray, 1509 Meadowview, El Paso, Tex. 79915**

**Filed Jul. 18, 1985, Ser. No. 756,286**

**Int. Cl.[4] D05B *3/20***

**U.S. Cl. 112—121.12** **17 Claims**



1. In a sewing machine having a carrier means including a platen for supporting a workpiece, a reciprocating needle, and a supply of labels, a label emplacer comprising, in combination, a pressure frame mounted on the carrier means, means including a label pressure foot mounted on the pressure frame for lateral reciprocatory movement thereon and being adapted for selecting one of the labels from the label supply, means for transferring the label pressure foot and the said one label to a stitching position relative to the pressure frame, means for depressing the pressure frame along with the label pressure foot to securely retain the workpiece to the platen and the label to the workpiece, respectively, means for moving the pressure frame and the label pressure foot as a unit as the label is stitched to the workpiece by the reciprocating needle, and means for moving the label pressure foot out of the path of the reciprocating needle as the stitching of the label is being substantially completed.

**4,590,873**

## SEWING ASSEMBLY WITH A SEWING MACHINE MOVABLE ALONG THE WORK

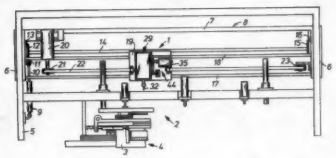
**Mathias Ulmen, Kindsbach, Fed. Rep. of Germany, assignor to Pfaff Industriemaschinen GmbH, Fed. Rep. of Germany**

**Filed Jan. 18, 1985, Ser. No. 693,011**

**Claims priority, application Fed. Rep. of Germany, Jan. 20, 1984, 8401548[U]**

**Int. Cl.[4] D05B *3/00***

**U.S. Cl. 112—121.14** **5 Claims**



1. A sewing assembly comprising a work holding device, a sewing machine support, a sewing machine carried by said support and being pivotal thereon, a motor driving said sewing machine, and guide and drive means for effecting a relative motion between said workpiece holding device and said sewing machine, said sewing machine being mounted on said support for pivoting about an axis which extends transversely to said guide and drive means, and an eccentric drive on said support connected to said sewing machine to effect an oscillatory motion thereon superimposed on said relative motion.

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**4,590,874**

## TENSION REGULATOR FOR ELASTIC TAPE AND THE LIKE, PARTICULARLY IN SEWING MACHINES ADAPTED TO ATTACH TAPE TO A WORKPIECE

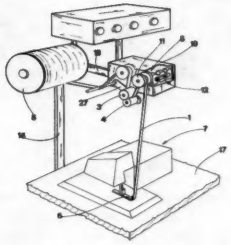
**Luca Baclagis, Maranello, Italy, assignor to Ram Elettronica di Baclagis Luca & C. S.n.c., Modena, Italy**

**Filed Aug. 13, 1984, Ser. No. 639,694**

**Claims priority, application Italy, Dec. 30, 1983, 40132 A/83**

**Int. Cl.[4] D05B *21/00***

**U.S. Cl. 112—121.26** **8 Claims**



1. A tension regulator for elastic tape and the like, suitable for use in sewing machines adapted to attach tape to a workpiece, comprising:

a pulley fitted to rotate about its own axis, located along the track of the tape between a tape feeding bobbin and the sewing machine's presser foot wherein said tape is wound about a part of the circumference of said pulley during its travel;

electromechanical transducer means to which the axis of rotation of said pulley is integrally connected and on which the stress caused by the tension of the tape acts, which is adapted to convert the deformation produced by said stress on its mechanical part into an electric signal;

motor means suitable to drivingly feed said tape to said

presser foot, with respect to a tension force for the feed of tape depending upon the request from the sewing machine and said electric signal from said transducer means;

electric comparator means for comparing said electric signal from said transducer with a preselected reference signal and to deliver a command to a processor means; and

processor means adapted to convert said command into a driving signal for said motor means.

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**4,590,875**

## MODULAR SEWING MACHINE

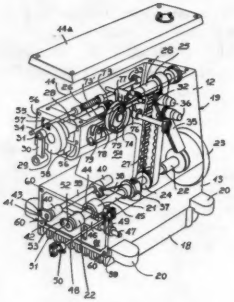
**Roberto Sanvito; Emilio Fietta, both of Milan, and Giancarlo Della Torre, Biassono, all of Italy, assignors to Rockwell-Rimoldi S.p.A., Italy**

**Continuation-in-part of Ser. No. 524,067, Aug. 17, 1983, abandoned, which is a continuation of Ser. No. 248,588, Mar. 27, 1981, abandoned. This application Jan. 17, 1985, Ser. No. 692,262**

**Claims priority, application Italy, Mar. 31, 1980, 21055 A/80**

**Int. Cl.[4] D05B** *1/00, 3/24, 73/00*

**U.S. Cl. 112—168** **1 Claim**



1. An improved modular sewing machine frame comprising:

(a) a base member having a vertically extending planar mounting surface formed on one side thereof;

(b) a lower horizontal base unit carrying lower stitching instrumentalites demountably secured to said mounting surface of said base member and providing a work supporting surface;

(c) a vertical upright extending upwardly from said base unit and including a horizontal arm that extends outwardly in overlying relationship with respect to said horizontal base unit and the work supporting surface thereof, said horizontal arm terminating in a vertically extending planar mounting surface that is substantially coplanar with the said mounting surface of said base unit; and

(d) a head unit carrying upper stitching instrumentalities adapted to cooperate with the lower stitching instrumentalities to form stitches, said head unit being demountable secured to said planar mounting surface of the horizontal arm of said vertical upright.

**4,590,876**

## EDGE GUIDE AND FABRIC FEED FOR SEWING MACHINE

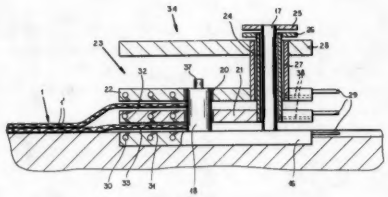
**Helmut Mencke, Schulzendorf; Hans-Jürgen Grüner, Zeuthen; Peter Oertmann, Schulzendorf; Horst Nerlich, Schulzendorf, and Heinz Grabasch, Schulzendorf, all of German Democratic Rep., assignors to VEB Kombinat Oberbekleidung Berlin Stammbetrieb VEB Herrenbekleidung Fortschritt, Berlin, German Democratic Rep.**

**Filed Dec. 20, 1984, Ser. No. 684,010**

**Claims priority, application German Democratic Rep., Dec. 21, 1983, 2583536; May 21, 1984, 2632111**

**Int. Cl.[4] D05B** *35/10*

**U.S. Cl. 112—262.3** **20 Claims**



1. A method of feeding a pair of superposed flexible web workpieces lying on a horizontal table in a horizontal transport direction to a treatment location downstream of an edge guide having vertically spaced upper, lower, and middle plates defining upper and lower horizontally open slots, the method comprising the steps of:

continuously horizontally reciprocating the table with a stroke sufficiently long relative to the surface structure of the lower face of the underlying workpiece and at a frequency sufficiently high relative to the inertia of the workpieces that the workpieces will move horizontally relative to the table without substantial friction;

engaging an edge of each of the workpieces in a respective one of the slots; and

directing jets of gas from the plates at an angle against the workpieces and thereby holding up the upper and middle plates while urging the workpiece edges into the respective slots substantially out of contact with the plates.

7. An apparatus for feeding a pair of superposed flexible web workpieces to a treatment location, the apparatus comprising:

a horizontal table supporting the workpiece and oriented in a workpiece travel direction upstream therefrom;

an edge guide downstream from the treatment location and having vertically spaced upper, lower, and middle plates defining upper and lower horizontally open slots receiving the edges of the upper and lower workpieces, the upper and middle plates being limitedly vertically displaceable relative to the lower plate and each other and being provided with angled nozzles opening inward into the respective slots;

support means carrying the table and permitting same to move limitedly horizontally;

drive means for continuously horizontally reciprocating the table with a stroke sufficiently long relative to the surface structure of the lower face of the underlying workpiece and at a frequency sufficiently high relative to the inertia of the workpieces that the workpieces will move horizontally relative to the table without substantial friction; and

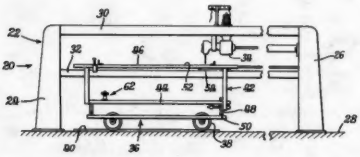
means for supplying gas to the nozzles and therefrom against the workpieces for holding up the upper and middle plates while urging the workpiece edges into the respective slots substantially out of contact with the plates.

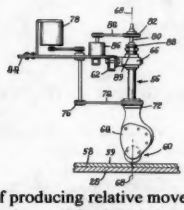
4,590,877

## SHAPE FORMING AND QUILTING METHOD

Michael Schwarzberger, Chicago, Ill., assignor to ABM Industries, Inc., Skokie, Ill.

Division of Ser. No. 500,023, Jun. 1, 1983, Pat. No. 4,505,212.
This application Feb. 28, 1985, Ser. No. 706,740
Int. Cl.[4] D05B *97/00, 21/00*
U.S. Cl. 112—262.3 8 Claims





1. A method of producing relative movement between components that include a tool head and a work piece on which it works, and in which the movement is along both x and y axes, comprising the steps,

utilizing a single drive unit, connected with one of those components, in operable association with a drive surface containing those axes, and operating the drive unit by its engagement with the drive surface, and providing the drive unit so that it is movable linearly along the drive surface and thereby operable for moving said one of the components, and

utilizing control means independent of the drive surface for effecting the linear movement of the drive unit and for controlling the direction of that movement.

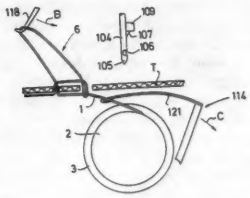
4,590,878

## DECORATIVE STITCH TYPE AND METHOD OF AND APPARATUS FOR PRODUCING SAME

Roberto Conti, Milan, Italy, assignor to Complett S.p.A., Milan, Italy

Filed Jul. 30, 1984, Ser. No. 635,819
Claims priority, application Italy, Jul. 29, 1983, 22346 A/83; Feb. 9, 1984, 19525 A/84
Int. Cl.[4] D05B *1/00*
U.S. Cl. 112—266.1 15 Claims

1. A stitch type which comprises a single thread having respective loops each passing from one side of a fabric through a first hole of pairs of holes spaced along said fabric onto the opposite side thereof and returning at least partially through a second hole of each pair so that a bight of each loop engages around a single strand of the thread running from the second hole of one pair of the first hole of another pair of holes along said fabric whereby the stitch thread is visible between the holes of each pair on said other side of said fabric and the



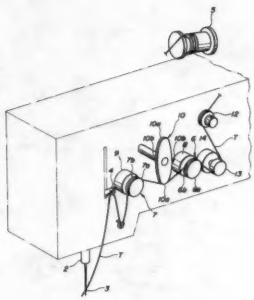
thread is invisible between said pairs of holes on said other side of said fabric.

4,590,879

## THREAD FEED DEVICE IN A SEWING MACHINE

Toru Matsubara, Tokyo; Ikuro Iimura, Kanagawa; Kuniharu Sakuma, and Sumio Goto, both of Tokyo, all of Japan, assignors to Tokyo Juki Industrial Co., Ltd., Chofu, Japan

Filed Nov. 15, 1983, Ser. No. 551,854
Int. Cl.[4] D05B *47/04, 49/00*
U.S. Cl. 112—278 7 Claims



1. A thread feed apparatus for use in a sewing machine having a thread take-up lever movable in thread tensioning and slackening directions and a thread supply source with at least a portion of a thread feed path extending between the thread supply source and the take-up lever, said apparatus comprising first holding means for gripping the thread at a first location along the thread feed path, said first holding means being operable between an engaged condition in which said first holding means grips a portion of the thread and holds the gripped portion of the thread against movement and a disengaged condition in which said first holding means is ineffective to grip the thread, second holding means for gripping the thread at a second location along the thread feed path, said second holding means being operable between an engaged condition in which said second holding means grips a portion of the thread and holds the gripped portion of the thread against movement and a disengaged condition in which said second holding means is ineffective to grip the thread, control means for operating said first holding means between the en-

gaged and disengaged conditions and for maintaining said first holding means in the disengaged condition during at least a portion of the movement of the thread take-up lever in a thread slackening direction, said control means including means for maintaining said second holding means in the engaged condition while said first holding means is in the disengaged condition, thread paying-out means engageable with the thread at a location between said first and second holding means for increasing the length of the thread path between said first and second holding means while said first holding means is in the disengaged condition and said second holding means is in the engaged condition, and thread paying-out detection means connected with said control means and disposed in engagement with the thread at a location upstream of said thread paying-out means for detecting when the thread path between said first and second holding means has increased by a predetermined amount, said control means including means for effecting operation of said first holding means from the disengaged condition to the engaged condition in response to said thread paying-out detection means detecting that the thread path between said first and second holding means has increased by the predetermined amount.

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**4,590,880**

## ELECTRONIC SEWING MACHINE HAVING MEANS FOR INDICATING A SERIES OF PATTERN NUMBERS IN NORMAL AND REVERSE ORDER

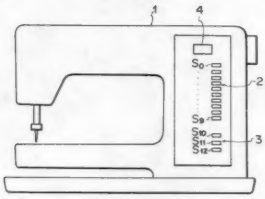
**Hachiro Makabe, Kanagawa; Haruhiko Tanaka, Tokyo, and Takashi Kongoh, Koganei, all of Japan, assignors to Janome Sewing Machine Co., Ltd., Tokyo, Japan**

**Filed May 31, 1984, Ser. No. 616,433**

**Claims priority, application Japan, Jun. 10, 1983, 58-87819[U]**

**Int. Cl.[4] D05B *3/02, 19/00***

**U.S. Cl. 112—445** **1 Claim**




1. An electronic sewing machine, comprising a memory storing stitch control data for a plurality of different patterns which may be selected by designation of pattern numbers each specific to the stored patterns;

a second memory for temporarily storing the pattern numbers as the latter are selected in series;

a display for electrically indicating the selected pattern numbers one after another as the latter are stored in said second memory, maintaining a precededly selected pattern number until the subsequent one is selected;

pattern selecting means including ten-keys selectively operated to provide two-figure numbers for selecting said stored patterns, said ten-keys including at least two ten-keys operated in combination to provide at least two specific two-figure numbers;

function key means including at least two-function keys selectively operated in conjunction with said ten-keys to change the function of said sewing machine, one of said function keys being operated to memorize the selected pattern numbers in said second memory;

discriminating circuit means responsive to the selective operation of said ten-keys for selecting said patterns and said two specific ten-keys for providing said specific two-figure numbers, to thereby produce different signals;

pattern number memorizing control circuit means responsive to the operation of said ten-keys for selecting said patterns to cause said second memory to memorize the selected pattern numbers in the order as the latter are selected;

function changing circuit means responsive to the operation of said ten-keys for selecting the stored patterns to produce a signal for maintaining the function of said two-function keys, said function changing circuit means being responsive to the operation of said two-specific ten-keys on one or the other way to produce a different signal for changing the function of said two-function keys; and

pattern number read-out circuit means responsive to the operation of one of said two function keys to designate the pattern numbers memorized in said second memory to appear in said display in the order as the latter have been memorized while said function changing circuit means receives a signal from said discriminating circuit means when said two specific ten-keys have been operated in one way, said pattern number read-out circuit means being responsive to the operation of the other of said two function keys to designate said memorized pattern number to appear in said display in the reverse order as the latter have been memorized while said function changing circuit means receives a signal from said discriminating circuit means when said two specific ten-keys have been operated in the other way.

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**4,590,881**

## SEWING MACHINE AND METHOD OF SEWING PATTERNS

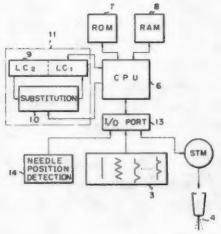
**Fumio Wada, Tokyo, Japan, assignor to Tokyo Juki Industrial Co., Ltd., Chofu, Japan**

**Filed Sep. 17, 1985, Ser. No. 776,895**

**Claims priority, application Japan, Sep. 28, 1984, 59-204271**

**Int. Cl.[4] D03B *3/02***

**U.S. Cl. 112—456** **4 Claims**




1. A sewing machine for stitching a stitch pattern having a predetermined shape in accordance with stitch pattern data, comprising:

a memory circuit for storing as said stitch pattern data an initial value indicating the needle swing position for stitch start, a basic stitch number indicating the stitch number required for the formation of one pattern, and quantity of needle swing every stitch pattern;

an arithmetic and logic circuit having a low order digit portion and a high order digit portion;

an instruction circuit for instructing stitch patterns to be stitched;

a first means for reading from said memory circuit said stitch pattern data corresponding to the instruction from said instruction circuit;

a second means for setting said basic stitch number into the low-order digit portion of said arithmetic and logic circuit in accordance with said stitch pattern data from said first means;

a third means for adding logic value "1" to each digit of the low-order digit portion of said arithmetic and logic circuit into which said basic stitch number has been set by said second means, outputting the arithmetic data, repeating said arithmetic operation and, when the result of the arith-

metic operation is a predetermined value, cycling said arithmetic operation; and

a fourth means for determining at least two different needle swing positions in accordance with the arithmetic data from said third means.

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**4,590,882**

## SHACKLES

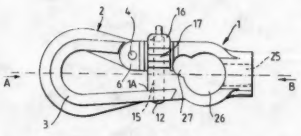
**Jack J. Murphy, Chapel Elms, Chapel Lane, West Wittering, West Sussex, England**

**Filed Mar. 8, 1984, Ser. No. 587,725**

**Claims priority, application United Kingdom, Mar. 8, 1983, 8306381**

**Int. Cl.[4] B63H *9/08***

**U.S. Cl. 114—108** **11 Claims**




1. A shackle comprising a body component and a latch component wherein the latch component includes a latch arm hinged to the body component to form a closed loop therewith when latched, a plunger housed within a bore formed in the body and movable against a biassing force between a first position in which the plunger extends into the latch arm to hold the latch arm in the latched position and a second position in which the plunger is withdrawn to permit opening of the latch arm about the hinge, a releasing handle for displacing the plunger into the second position, the releasing handle having the form of a U-shaped bridge which straddles the body component with the legs of the bridge movable between shoulders formed on opposite faces of the body component, and a connecting means for detachably connecting the handle to the plunger, the connecting means comprising an aperture extending through the handle, a notch extending radially outwardly from the aperture wall and having a depth which is less than the axial length of the aperture, the plunger including a head with a projection extending radially outwardly therefrom and having a shape which engages said notch, the head and the projection together having a shape permitting passage through the aperture whereupon, after passage through the aperture, angular movement of the head permits engagement of said projection in said notch and, when so engaged, movement of the handle against the biassing force displaces the plunger between the said first and second positions, to open the latch.

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**4,590,883**

## FLAG MOUNTING

**Ivan V. Steed, and Jeffrey I. Gill, both of Adelaide, Australia, assignors to Steed Signs Pty. Limited, Australia**

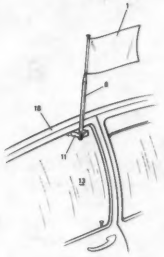
**Filed Apr. 7, 1983, Ser. No. 482,913**

**Claims priority, application Australia, Dec. 9, 1982, PF7196**

**Int. Cl.[4] G09F *17/00***

**U.S. Cl. 116—173** **1 Claim**

1. In combination, a flag, a separable two-piece flag mast and mounting means for mounting the flag in the window opening of a vehicle, the flag having a tubular mounting fold at one end thereof, said two-piece mast comprising a supporting rod to freely pass through said fold and a handle to which said supporting rod is separably joined, said supporting rod having a knob at an upper end thereof and a circumferential abutment adjacent a lower end thereof, said handle being of greater outer diameter than said tubular fold and having an aperture at an upper end thereof with a circumferential groove in said aperture to frictionally receive said supporting rod lower end with said circumferential abutment nesting into said circumferential groove to firmly hold said two-piece mast together with the flag being vertically supported only by said handle upper end and permitting easy separation of said two-piece mast for removal of the flag, said mounting means comprising a rigid mounting block, said mounting block having a recess in a lower surface of said block to receive an upper edge of a glass window of the vehicle, and a rib on an upper surface of said block, said rib being parallel to and opposite said recess to enter a window slot in the vehicle so that said block is firmly held between said window slot and said window upper edge when the window is closed, the distance between the bottom of said recess and said upper surface of the block being mini-




mal, and an aperture in said block to receive said handle, whereby in use said supporting rod is passed throught the tubular mounting fold of the flag and said supporting rod lower end is inserted into said aperture of said handle with said circumferential abutment firmly nesting into said circumferential groove so that said flag is retained and supported below said knob and on said handle upper end, and said handle is inserted into said aperture in said block, the block being positioned over the upper edge of the glass of the window which is then raised to engage said rib in said window slot, said minimal distance allowing the window to be substantially closed.

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**4,590,884**

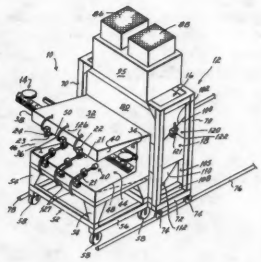
## PORTABLE POWDER SPRAY SYSTEM

**Ken Kreeger, Avon Lake, and Gene Tank, Amherst, both of Ohio, assignors to Nordson Corporation, Amherst, Ohio**

**Filed May 9, 1985, Ser. No. 732,424**

**Int. Cl.[4] B05D *15/12***

**U.S. Cl. 118—308** **8 Claims**



1. A powder spray apparatus comprising

a powder spray booth having a spray chamber contained internally of the booth,

a powder collector including a fan plenum and a filter module, said filter module having at least one filter contained within a filter chamber of said module, said filter chamber of said module being open to the interior of said booth and said fan plenum being operable to draw air from said booth and through said filter in said filter chamber,

vertical supports upon each side of said booth and upon each

side of said powder recovery system for supporting said booth and powder recovery system above a floor,

rollers on the bottom of said vertical supports of said booth and said powder recovery system for facilitating movement of said booth and powder recovery system into and out of alignment with a horizontal conveyor upon which product is to be conveyed through said booth,

said spray chamber of said booth being defined by a front wall, top wall, rear wall, bottom wall and a pair of side walls, said side walls each having an opening therein extending from the front of said booth toward said rear of said booth,

an opening in said front wall of said booth, said opening in said front wall of said booth being substantially coextensive with said side wall openings such that a horizontal conveyor may be passed through said front and side openings when said booth is moved on said rollers into alignment with the conveyor.

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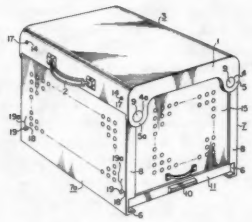
**4,590,885**

## COLLAPSIBLE ANIMAL CAGE

**Masami Sugiura, Fuji, Japan, assignor to Tokyo Petcage Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 94,445, Nov. 15, 1979, abandoned. This application Jul. 20, 1981, Ser. No. 285,282**
**Claims priority, application Japan, Dec. 7, 1978, 53-168854**
**Int. Cl.[4] A01K** *31/08*
**U.S. Cl. 119—19** **4 Claims**



1. A collapsible animal cage comprising:

a cover frame having two pairs of pivot projections, each pair of which extend downwards at different distances from both sides of each end, the two lower pivot projections being positioned in one side of the cover frame and the two higher pivot projections in the other side;

a pair of side plates, one of which is higher than the other, each having a bottom groove in its lower end, the upper parts of the higher and the lower side plates being pivotally mounted to the lower and the higher pivot projections of the cover frame;

a pair of end plates whose upper parts are pivotally mounted to the end portions of the cover frame and whose lower parts are fixed to the side plates and are detachable therefrom; and

a bottom plate which is slidably inserted in the bottom grooves of the side plates.

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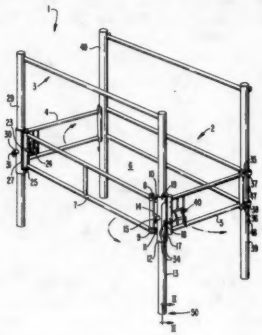
**4,590,886**

## PORTABLE HORSE STOCKS

**Robert L. Brashear, 2300 Ash Ave., Anchorage, Ky. 40223**

**Filed Nov. 19, 1984, Ser. No. 672,599**
**Int. Cl.[4] A61D** *3/00;* **A01K** *1/00*
**U.S. Cl. 119—27** **19 Claims**

18. Portable stocks formed from a plurality of components which may be readily assembled and disassembled for ease in transportation and storage, comprising a pair of opposite side frames of said stocks positioned in spaced relationship, a pair of opposite end members of said stocks positioned in spaced relationship and extending transversely between said opposite side frames to define a space with said side frames within said stocks for confining a horse or the like, means releasably connecting said end members to said side frames to permit said assembly and disassembly, at least one of said end members being an end gate swingably mounted on one of said side frames for movement between an open position providing access to said space through an end gate opening and a closed position substantially blocking said end gate opening, and at least one of said side frames including a side gate swingably mounted on the side frame for movement between an open position providing access to said space through a side gate



opening and a closed position substantially blocking said side gate opening, wherein means are provided for adjusting the height of said at least one end gate of said horse stocks with respect to said side frames, and wherein a latch is provided on said end gate for releasably securing said end gate in the closed position to one of said side frames and wherein means are provided for adjusting the vertical position of said latch on said end gate so that said latch can releasably connect the end gate to a single stationary latch lug on said side frame at different heights of said end gate with respect to said side frames.

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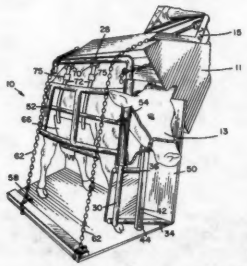
**4,590,887**

## ANIMAL CRADLE

**Weikko R. Holopainen, Clover Ridge Farm, Barre Rd., Hubbardston, Mass. 01542**

**Filed Dec. 5, 1984, Ser. No. 678,265**
**Int. Cl.[4] A61D** *3/00*
**U.S. Cl. 119—103** **11 Claims**



1. Animal cradle comprising:

(a) a housing which is adapted to be fastened to the bucket of a tractor, said housing having a vertical back wall, and a vertical support at one end of the housing which is fixed to one end of the back wall,

(b) a vertical gate, one end of which is pivotally connected to said vertical support for movement about a vertical axis

between a closed position and an open position, said gate extending from said support toward the opposite end of said housing and terminating in a free end at the opposite end of the gate, said free end being spaced from said back wall when said gate is in the open position so that an entrance opening is formed between said free end and the opposite end of said back wall, said entrance opening being sufficiently large to allow an animal to walk through said opening into the cradle, said gate, when in the closed position, forming a front barrier which is spaced from said back wall and an end barrier at the opposite end of said housing,

(c) fastening means operatively connected to the housing for fastening the housing to the bucket of a tractor so that when the bucket is lifted and rotated by the tractor about a horizontal axis, the cradle is raised and rotated, respectively, with the bucket, and

(d) support means operatively connected to the housing for supporting the animal within the housing so that when the cradle is rotated 90° about a horizontal axis so that the back wall assumes a horizontal position beneath the animal, the weight of the animal is transferred from the support means to said back wall.

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**4,590,888**

## WATER HEATER

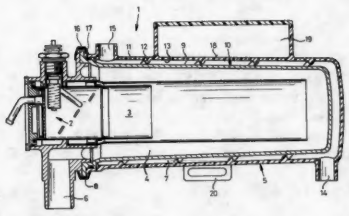
**Ernst Mosig, Iffeldorf, Fed. Rep. of Germany, assignor to Webasto-Werk W. Baier GmbH & Co., Fed. Rep. of Germany**

**Filed Dec. 18, 1984, Ser. No. 683,211**

**Claims priority, application Fed. Rep. of Germany, Jan. 3, 1984, 3400048**

**Int. Cl.⁴ F22B *7/12***

**U.S. Cl. 122—149** **19 Claims**



**1**. A water heater for a vehicle having a burner unit and a combustion chamber surrounded by a heat exchanger in a manner defining an annular out-flow space therebetween through which combustion gases flow to an exhaust outlet after emerging from the combustion chamber and being deflected in an opposite direction, said heat exchanger having an internal ring-shaped space through which a liquid heat transfer medium is circulated that is formed by an inner casing and an outer casing with an inlet piece and an outlet piece; wherein said outer casing is made of plastic and said inner casing is made of metal; wherein said inner and outer casings are joined together by flange means at an end thereof in a manner creating a gas-tight, pressure-resistant connection therebetween that is stable with respect to temperature changes resulting from use of the heater.

**4,590,889**

## ARRANGEMENT FOR INFLUENCING A COOLING AIR FLOW

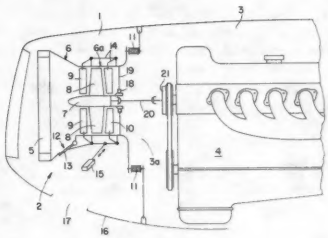
**Hermann Hiereth, Esslingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Apr. 12, 1985, Ser. No. 722,661**

**Claims priority, application Fed. Rep. of Germany, Apr. 18, 1984, 3414609**

**Int. Cl.⁴ F01P *5/06***

**U.S. Cl. 123—41.05** **5 Claims**



**1**. In a cooling air system for regulating a flow of air passing through a heat exchanger mounted in a cooling system housing and discharging into an internal-combustion engine housing of a vehicle, the cooling system housing being formed to include an opening to the atmosphere, the improvement comprising:

air guiding means for conducting the flow of air from the heat exchanger to the internal-combustion engine housing along a path through the cooling system housing, the air guiding means being formed to include an outlet in communication with the atmosphere opening,

a vent movable between an outlet-opening position and an outlet-closing position,

guide blade means for regulating the flow of air through the air guiding means, and

control means for moving selectively the vent to its outlet-opening position to discharge a portion of the air flow toward the atmosphere opening via the outlet opening.

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**4,590,890**

## FAN HOUSING FOR ENGINE

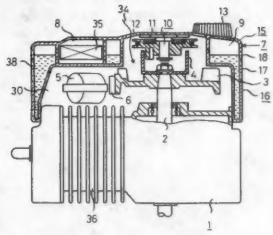
**Shinichi Tamba, and Noboru Fukui, both of Kakogawa, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Hyogo, Japan**

**Filed Dec. 19, 1984, Ser. No. 683,506**

**Claims priority, application Japan, Dec. 20, 1983, 58-241707**

**Int. Cl.⁴ F01P *1/02***

**U.S. Cl. 123—41.7** **2 Claims**



**1**. A combined fan housing and fuel tank assembly for attachment to the top of a vertical engine and above the output shaft thereof, comprising:

(a) an upper shell constructed of a pigmented weather resistant synthetic plastic resin and provided with a depending

skirt at its outer periphery forming an outer wall and a depending inner wall spaced inwardly from said outer wall forming, together with said outer wall, part of a fuel tank, and

(b) a lower shell constructed of transparent synthetic resin and provided with like outer and inner walls in engagement with and hermetically sealed to corresponding walls of said upper shell to form said fuel tank.

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**4,590,891**

## ENGINE COOLING SYSTEM IN FIELD MACHINERY

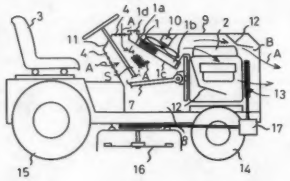
**Tetsuzo Fujikawa, Kobe, and Tamba Shinichi, Kakogawa, both of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Hyogo, Japan**

**Filed Nov. 20, 1984, Ser. No. 673,438**

**Claims priority, application Japan, Nov. 22, 1983, 58-180657[U]**

**Int. Cl.⁴ F01P *3/18***

**U.S. Cl. 123—41.11** **1 Claim**



1. A cooling system for an engine in a compartment forming part of a farm machine exposed to small plant particles, comprising

a cooling radiator in an upper portion of said compartment and rearwardly of said engine, said radiator being disposed angularly from the horizontal with the lower end thereof slanting toward said engine;

a cooling fan disposed above said radiator to draw cool air from beneath and upwardly through said radiator;

a cooling air inlet disposed in the upper rear portion of said compartment; and an exhaust air outlet disposed near the front end of said compartment to direct the exhaust air ahead of said machine, whereby to blow such plant particles ahead of the machine and minimize the amount thereof reaching said cooling air inlet.

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**4,590,892**

## COOLING SYSTEM FOR VEHICLE

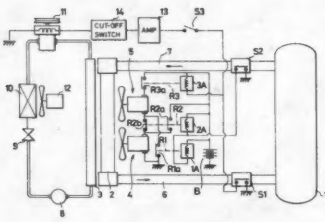
**Toshimitsu Nose, and Toshio Ohashi, both of Atsugi, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Oct. 5, 1984, Ser. No. 657,880**

**Claims priority, application Japan, Oct. 7, 1983, 58-187797**

**Int. Cl.⁴ F01P *5/02***

**U.S. Cl. 123—41.12** **4 Claims**



1. A cooling system for a vehicle configured so as to vary draft volume to the radiator through which engine cooling medium is circulated in accordance with operating conditions of the engine, comprising:

a plurality of motor fans for air cooling the radiator,

sensor means for sensing the temperature of the cooling medium at both the inlet and outlet sides of the radiator, and

an operational mode control means, responsive to the outputs of said sensor means, for selectively controlling a plurality of operational modes programmed to selectively supply power to each of said plurality of motor-fans in order to optimize draft volume to the radiator, thereby enabling fine adjustment of draft volume to the radiator in order to effect a desired cooling of the engine;

wherein said operational modes include a parallel drive mode for parallely providing power to each of said plurality of motor-fans, a serial drive mode for serially providing power thereto, a parallel drive mode for providing power to less than all of said plurality of motor-fans, and an OFF mode for disconnecting all said plurality of motor-fans from the power source; and

wherein said operational mode control means selectively controls the control mode of the system according to the Table

| Conditions | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| air conditioner switch | OFF | o | o | o | o | | | | |
| | ON | | | | | o | o | o | o |
| Temperature of water from radiator | up to $T_1$ | o | | o | | o | | o | |
| | above $T_1$ | | o | | o | | o | | o |
| Temperature of water into radiator | up to $T_2$ | o | o | | | o | o | | |
| | above $T_2$ | | | o | o | | | o | o |
| driving mode of motor-fans | | OFF | LO | MI | HI | LO | LO | HI | HI |

wherein $T_2$ is greater than $T_1$, HI indicates a parallel drive mode, MI indicates a partial drive mode, LO indicates a serial drive mode and OFF indicates an OFF mode.

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**4,590,893**

## COOLANT LEVEL SENSOR ARRANGEMENT FOR INTERNAL COMBUSTION ENGINE

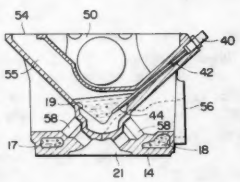
**Yoshinori Hirano, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Aug. 30, 1984, Ser. No. 645,629**

**Claims priority, application Japan, Sep. 2, 1983, 58-161601**

**Int. Cl.⁴ F01P *3/22***

**U.S. Cl. 123—41.21** **6 Claims**



1. In a cooling system for a device having a structure subject to heating

a coolant jacket formed about said heated structure into which coolant is introduced in liquid form and discharged in gaseous form;

a radiator in which gaseous coolant is condensed to its liquid form;

vapor transfer means for conveying gaseous coolant from said coolant jacket to said radiator;

a liquid coolant return conduit leading from said radiator to said coolant jacket, said coolant jacket, said radiator, said vapor transfer means and said liquid coolant return conduit defining a cooling circuit;

a reservoir containing liquid coolant, said reservoir being discrete from the cooling circuit;

valve and conduit means for selectively placing the cooling circuit in a hermetically sealed closed circuit condition and for controlling communication between said radiator and the cooling circuit in a manner which permits coolant to be inducted into the cooling circuit from the reservoir when the engine is stopped;

a level sensor disposed within said coolant jacket in close proximity of said heated structure for sensing the level of liquid coolant at a first predetermined level which is higher than said heated structure;

an arrangement which becalms the environment immediately surrounding said level sensor and which attenuates movement of the liquid coolant which would otherwise tend to induce erroneous level indications by said level sensor; and

a pump responsive to said level sensor for pumping liquid coolant into said coolant jacket in a manner to maintain the level of liquid coolant at the first predetermined one.

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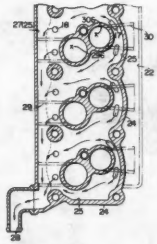
**4,590,894**

## COOLANT PASSAGE SYSTEM OF INTERNAL COMBUSTION ENGINE

**Yoshiyuki Ishida, Tokyo, and Yosio Taguchi, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Continuation of Ser. No. 639,356, Aug. 10, 1984, abandoned.**
**This application Mar. 18, 1985, Ser. No. 713,091**
**Claims priority, application Japan, Aug. 18, 1983, 58-151013**
**Int. Cl.[4] F02F *1/10***
**U.S. Cl. 123—41.74** **9 Claims**



1. An internal combustion engine comprising:

a cylinder block comprising a row of cylinders, a cylinder block water jacket, a coolant distributor passage which extends along the cylinder row on a first side of the cylinder row in proximity to a top of said cylinder block and which is fluidly connected with said cylinder block water jacket for supplying a coolant to said cylinder block jacket, a first side portion defining a plurality of first communication holes lying on the first side of the cylinder row, and a second side portion defining a plurality of second communication holes lying on a second side of the cylinder row opposite to the first side, end

a cylinder head mounted on the top of said cylinder block for the cylinder row, said cylinder head comprising a cylinder head water jacket, a coolant collector passage which extends along the cylinder row on the second side, and is fluidly connected with said cylinder head water jacket for allowing the coolant to go out from said cylinder head jacket, a first side portion defining said first communication holes together with said first side portion of said cylinder block, and a second side portion defining said second communication holes together with said second side portion of said cylinder block, said first and second communication holes making a fluid communication between said cylinder block water jacket and said cylinder head water jacket, said first and second communication holes being so sized that the total opening area of said first communication holes is greater than the total opening area of said second communication holes, said cylinder head having at least one intake port and at least one exhaust port associated with each said cylinder, said coolant flowing parallel to a line joining the centers of respective inner ends of said intake and exhaust ports.

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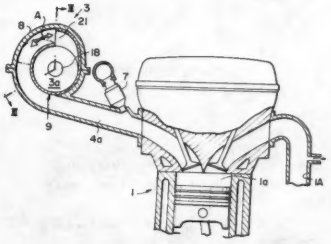
**4,590,895**

## INTAKE PASSAGE FOR INTERNAL COMBUSTION ENGINE

**Yoshikuni Yada, and Syunki Okazaki, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Mar. 20, 1984, Ser. No. 591,458**
**Claims priority, application Japan, Mar. 22, 1983, 58-48344**
**Int. Cl.[4] F02B *75/13***
**U.S. Cl. 123—52 MB** **9 Claims**



1. A variable length intake passage for an internal combusion engine having at least one cylinder, said variable length intake passage extending between a common intake passage and said at least one cylinder, said variable length intake passage comprising:

a first tank member having an axis, said first tank member having an inlet and at least one outlet, said inlet of said first tank member connected to said common intake passage, each said outlet of said first tank member corresponding to a respective engine cylinder and connected to said respective engine cylinder, each said outlet comprising a radially expanded portion of said first tank disposed transverse to said axis and defining an arcuate fluid flow conduit of predetermined length;

a second tank member having an axis, said second tank member being rotatable about said axis, said second tank member coaxially enclosed within and completely surrounded by said first tank member for rotation relative to said first tank member, said second tank member having an inlet and at least one outlet, said inlet of second tank member connected to said inlet of said first tank member, each said outlet of said second tank member corresponding to a respective outlet of said first tank member, each said outlet of said second tank formed as a radially expanded portion of said second tank disposed transverse to said axis and defining an arcuate fluid flow conduit of predetermined length, said outlet of said second tank being of a length less than said outlet of said first tank, said outlet of said second tank being slidably received within said expanded portion of said outlet of said first tank; and

rotation means for rotating said second tank about said axis relative to said first tank, whereby rotation of said second

tank member relative to said first tank member varies the length of said intake passage from said common intake passage to said cylinder.

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**4,590,896**

## TWO-STROKE ENGINE

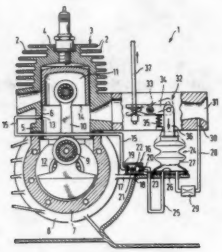
**Michael Wissmann, Markgröningen, and Harald Schliemann, Waiblingen, both of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany**

**Filed Feb. 21, 1985, Ser. No. 704,083**

**Claims priority, application Fed. Rep. of Germany, Feb. 21, 1984, 3406119**

**Int. Cl.[4] F02B *33/04***

**U.S. Cl. 123—73 R** **26 Claims**



1. A two-stroke engine equipped with a control device to control an operating condition of the engine, the engine comprising:

a crankcase subjected to continuously alternating underpressure and overpressure conditions;

signal means for providing a signal indicative of a predetermined value of the operating condition of the engine to be controlled;

an output actuator connected to said control device for adjusting said operating condition;

pneumatic actuating means responsive to a change in pressure therein for acting on said output actuator so as to cause the latter to adjust said control device to control said operating condition;

pressure connecting means for connecting said pneumatic actuating means to said crankcase; and,

valve means responsive to said signal for acting on said pressure connecting means so as to cause said pressure change to occur in said pneumatic actuating means.

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**4,590,897**

## IDLE FUEL RESIDUAL STORAGE SYSTEM

**James M. Hundertmark, Fond du Lac, Wis., assignor to Brunswick Corp., Skokie, Ill.**

**Filed Nov. 13, 1984, Ser. No. 670,390**

**Int. Cl.[4] F02B *33/04*; F02M *25/00***

**U.S. Cl. 123—73 A** **10 Claims**

1. In a two cycle internal combustion engine comprising:

a piston reciprocal in a cylinder between a crankcase and a combustion chamber;

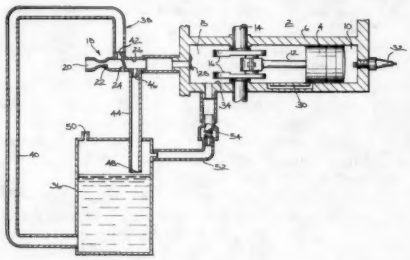
means for supplying fuel to said crankcase;

fuel-air transfer passage means between said crankcase and said combustion chamber;

said piston having a charging stroke in one direction compressing fuel-air mixture in said combustion chamber and creating a vacuum in said crankcase, and having a power stroke upon combustion of said mixture driving said piston in the opposite direction pressurizing said crankcase and forcing fuel-air mixture to flow from said crankcase through said transfer passage means to said combustion chamber for repetition of the cycle, and wherein heavy fuel ends accumulate in said crankcase;

the improvement comprising:

reservoir means connected to said crankcase for receiving said heavy fuel ends, said power stroke of said piston pumping said heavy fuel ends into said reservoir means; and



means responsive to engine speed for recirculating said heavy fuel ends back to said crankcase at high engine speed, and means blocking said recirculation at idle to minimize engine smoke.

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**4,590,898**

## HYDRAULIC TAPPET FOR DIRECT-ACTING VALVE GEAR

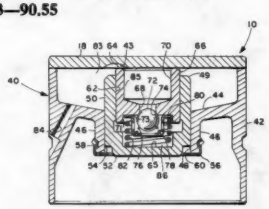
**Stephen M. Buente, Kalamazoo, and William T. Mihalic, Battle Creek, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio**

**Continuation of Ser. No. 431,541, Sep. 30, 1982, Pat. No. 4,470,381, which is a continuation of Ser. No. 100,689, Dec. 5, 1979, abandoned. This application Jun. 11, 1984, Ser. No. 619,750**

**The portion of the term of this patent subsequent to Sep. 11, 2001, has been disclaimed.**

**Int. Cl.[4] F01L *1/24***

**U.S. Cl. 123—90.55** **9 Claims**



1. A bucket tappet for a valve gear of an internal combustion engine of the type having one end of the tappet adapted for direct contact with a stem of a combustion chamber valve and the opposite end adapted for direct contact with a cam lobe, said bucket tappet comprising:

(a) a body member having a tubular wall portion with the outer periphery thereof adapted for being slidably received in a tappet guide surface formed in the engine, said body having a web portion depending from said tubular wall portion intermediate the ends thereof and extending inwardly therefrom, and a tubular hub portion depending solely from said web, said hub having the inner periphery thereof disposed in generally parallel relationship to the outer periphery of said wall portion, said hub portion having one end thereof extending axially beyond said web;

(b) a cam face member having a generally disc-shaped configuration with one face thereof adapted for contacting an engine cam, said face member being disposed across one end of said tubular wall portion and secured thereto about the periphery thereof in a fluid pressure sealing manner;

(c) plunger means slidably received in said hub portion in closely fitting relationship wherein said plunger means, said web, said tubular wall portion and said cam face member cooperate to define a fluid reservoir having an outer annular chamber and a central chamber, said plunger means including a member having an end face remote from said cam face and adapted for directly contacting a stem end of a combustion chamber valve, said plunger means having received therein hydraulic lash adjusting means communicating with said reservoir, to adjust the distance between said plunger end face and said cam face upon relaxation of engine valve timing forces thereon for adjusting lash between the valve stem and cam;

(d) said hydraulic lash adjusting means having surface portions thereof cooperating with adjacent surface portions of said cam face member to provide a passage interconnecting said central and annular chambers; and,

(e) retaining means operable to retain said plunger means in said hub.

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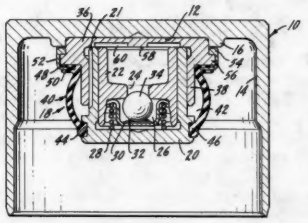
**4,590,899**

## SELF-CONTAINED LASH ADJUSTER WITH SHELL MOUNTED CARTRIDGE ASSEMBLY

**Steven J. Kowal, Prospect Heights, and Kenneth W. Lesher, Wheaton, both of Ill., assignors to Stanadyne, Inc., Windsor, Conn.**

**Filed May 17, 1985, Ser. No. 735,202**
**Int. Cl.[4] F01L *1/24***
**U.S. Cl. 123—90.58** **10 Claims**




1. A self-contained lash adjuster including a generally cylindrical cup-shaped follower having an end face, a lash adjuster cartridge assembly within said follower,

said cartridge assembly including a reciprocally movable body and a plunger within said body, a high pressure chamber between said plunger and body, a plunger passage opening into said high pressure chamber, a check valve controlling fluid flow through said plunger passage,

a shell holding said cartridge assembly and having an annular wall extending peripherally exteriorly of said movable body, said shell being mounted to said follower end face,

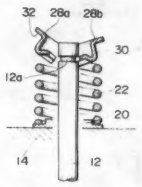
and an annular expandable seal member extending about said shell and cartridge assembly and fastened at one end to said shell and at the other end to said body to define a reservoir exterior of said cartridge assembly, movement of said body toward the plunger moving fluid from the high pressure chamber to said reservoir.

**4,590,900**

## VALVE SUPPORTING ARRANGEMENT OF AN INTERNAL COMBUSTION ENGINE

**Yoshimasa Hayashi, Kamakura, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Feb. 28, 1983, Ser. No. 470,374**
**Claims priority, application Japan, Mar. 2, 1982, 57-32726**
**Int. Cl.[4] F01L *1/00***
**U.S. Cl. 123—90.67** **6 Claims**




1. A supporting arrangement for a valve of an internal combustion engine having a valve stem portion, comprising a rigid member for supporting the stem portion of the valve for axial movement of the valve, a stamped or press-formed upper retainer connected to the upper portion of the valve stem, a lower annular retainer disposed on the rigid member and surrounding the valve stem, and a coil spring compressed between the upper and lower retainers to bias the valve in a direction to close the associated valve opening,

wherein said upper retainer has a substantially constant thickness throughout and comprises an annular collar portion having an essentially constant diameter along the length thereof with the diameter being at least substantially equal to the inner diameter of the coil spring, said collar portion being coaxially disposed within an upper portion of the coil spring, an annular flange portion extending radially outwardly from the upper end of the collar portion and engaging with the upper end of the coil spring, and means for achieving a spline connection between the central portion of the retainer and the upper portion of the valve stem, and wherein the upper retainer is divided along a diameter thereof into two identical elements which are disposed about the upper portion of the valve stem such that the radial pressure exerted by said coil spring operates to bias said identical elements into their respective positions operative to connect the upper retainer to the valve stem.

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**4,590,901**

## HEAT INSULATED RECIPROCATING COMPONENT OF AN INTERNAL COMBUSTION ENGINE AND METHOD OF MAKING SAME

**Howard Mizuhara, Hillsborough, Calif., assignor to GTE Products Corporation, Stamford, Conn.**

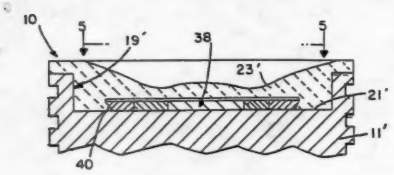
**Division of Ser. No. 495,848, May 13, 1983. This application Aug. 22, 1985, Ser. No. 768,533**
**Int. Cl.[4] F16J *1/04***
**U.S. Cl. 123—193 P** **4 Claims**

1. A heat insulated cylindrical component having a longitudinal axis and adapted for reciprocal axial movement adjacent to a combustion chamber of an internal combustion engine, said chamber having a wall, comprising:

a metallic body and a ceramic member, said member defining part of said combustion chamber wall, said body has an outwardly opening cavity defined by a planar bottom surface, said ceramic member being disposed within said cavity and having a coaxial recess opening toward said bottom surface and defined by a downwardly converging truncated conical side surface, and

means to attach said member to said body comprising a coaxial metal connector attached to said body and engag-

ing an adjacent part of said member, said connector constituting a plate complimentary shaped to said downwardly converging truncated conical side surface and being disposed in said recess and secured to said body at




said bottom surface, at least part of said connector having a minimum diameter adjacent said cavity planar bottom surface such that said connector radially overlaps the member.

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**4,590,902**

## INTERNAL COMBUSTION ENGINE

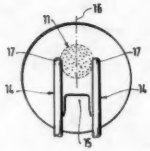
**Klaus-Dieter Zimmermann, Vaihingen, and Peter Hofbauer, Wolfsburg, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Feb. 6, 1985, Ser. No. 698,625**

**Claims priority, application Fed. Rep. of Germany, Feb. 29, 1984, 3407349**

**Int. Cl.[4] F02B** *9/08*

**U.S. Cl. 123—260** **7 Claims**




1. An internal combustion engine, comprising a plurality of cylinders; a main combustion chamber associated with each of said cylinders; a pre-combustion chamber; an overflow passage connecting said main combustion chamber with said pre-combustion chamber, so that said overflow passage tangentially opens into said pre-combustion chamber, said overflow passage having a central axis extending through a central plane of said pre-combustion chamber; a fuel injection device injecting a fuel in form a fuel stream extending also through said central plane of said combustion chamber; an incandescent ignition arrangement provided in said pre-combustion chamber and having a part which extends near said central plane and has a heated end arranged to extend to an end region of said fuel stream in its normal position, said ignition arrangement being located substantially outside of a projection of an inlet opening of said overflow passage along a gas stream flowing through said overflow passage into said pre-combustion chamber and therefore laterally outside of a contour of said inlet opening of said overflow passage.

**4,590,903**

## FUEL INJECTION APPARATUS FOR DEFINITE PILOT INJECTION AND MAIN INJECTION IN INTERNAL COMBUSTION ENGINES

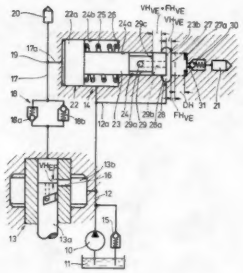
**Eberhard Hofmann, Kirchberg/M; Helmut Pfeifle, Recamier Allée; Reinhard Schwartz, Stuttgart, and Helmut Tschöeke, Ostfildern, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Aug. 24, 1984, Ser. No. 644,086**

**Claims priority, application Fed. Rep. of Germany, Aug. 26, 1983, 3330773; Jul. 11, 1984, 3425460**

**Int. Cl.[4] F02M** *39/00*

**U.S. Cl. 123—300** **15 Claims**




1. A fuel injection apparatus for pilot and main injection in internal combustion engines (Diesel engines), comprising a main injection nozzle supplied with a main injection quantity by a high-pressure injection piston via a pressure line having a hydraulic auxiliary pump connected thereto, said hydraulic auxiliary pump contains a reservoir piston, driven by the supply pressure of said high-pressure injection piston, said auxiliary pump further including a pilot injection piston including an annular groove having a frontal control edge for dimensioning the pilot injection nozzle quantity and said pilot injection piston including an end control edge relative to a work chamber, said frontal control edge of said annular groove being spaced from said end control edge to control the end of preinjection by relieving said work chamber and said end control edge controls a beginning of the preinjection stroke by closing said work chamber, a low-pressure fuel feed pump which delivers fuel for the pilot injection to said work chamber, said reservoir piston being embodied to drive said pilot injection piston at least indirectly, said pilot injection piston having a diameter that is less than that of said reservoir piston and constructed and arranged so that a spacing stroke (DH) of the reservoir piston which is free of injections, is predeterminable by said annular groove and by stop means and thereby receives an adjustable storage quantity of fuel within the spacing stroke (DH) and between the end of supply (FE1) of said pilot injection (VE) and the supply onset (FB2) of said main injection.

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**4,590,904**

## FUEL INJECTION APPARATUS

**Peter Wannenwetsch, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Jul. 27, 1984, Ser. No. 635,021**

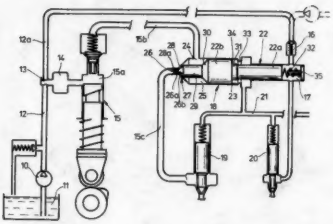
**Claims priority, application Fed. Rep. of Germany, Aug. 26, 1983, 3330772**

**Int. Cl.[4] F02M** *45/02, 59/38*

**U.S. Cl. 123—300** **1 Claim**

1. A fuel injection apparatus having pre-injection and main injection in internal combustion engines, comprising a main injection nozzle supplied with a main injection quantity of fuel by a high-pressure injection pump, a hydraulic pre-injection auxiliary pump driven by a supply of fuel under pressure of the high-pressure injection pump, said auxiliary pump includes a

stepped piston and a work chamber disposed upstream of said piston, said work chamber being fed by an uninterruptable supply of fuel via a fuel line fitted with check valve means leading from a low-pressure feed pump from which work chamber the pre-injection quantity is positively displaced to a pre-injection nozzle, said stepped piston including a driving piston portion exposed to the pressure of the high-pressure injection pump and a pre-injection piston portion of smaller diameter disposed downstream of the driving piston portion, said driving piston portion including an integral extension forming a stepped valve member of a slide pintle control valve controlled by movement of said stepped piston, said slide pintle control valve being provided with a seat in a pressure outlet of



a pressure chamber for said driving piston portion, said driving piston portion being embodied by a tapering, frustoconical transition to a cylindrical sealing part into which said valve member penetrates, said valve member being of complementary embodiment to said seat and having an anterior cylindrical portion associated therewith forming a slide pintle; whereby an inflow of fuel to the main injection nozzle may be blocked until a predetermined piston stroke of said stepped piston is attained and whereby the length and shape of the slide pintle determines the distance between the start of pre-injection and main injection independent of a stop means which limits the total stroke of said stepped piston determining the pre-injection quantity.

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**4,590,905**

## PROCESS FOR DECOMPRESSION CONTROL IN INTERNAL COMBUSTION ENGINE AND APPARATUS THEREFOR

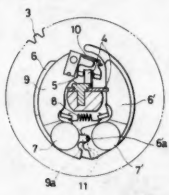
**Ikuo Matsuki, Tokyo; Naoyuki Kamiya, Kawagoe; Toshimitsu Ikeda, Kiyose; Yoshiari Takagi, Yokohama; Yoshio Iizuka, Tsurugashimamachi; Yoshinobu Yamaguchi, Niiza; Hiroshi Funai, Asaka; Mutsumi Terasawa, and Susumu Tasaka, both of Niiza, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 2, 1985, Ser. No. 729,822**

**Claims priority, application Japan, May 4, 1984, 59-88353; May 7, 1984, 59-89356; May 7, 1984, 59-89357; May 18, 1984, 59-98629**

**Int. Cl.[4] F02D *13/04***

**U.S. Cl. 123—321** **6 Claims**



**1**. A process for use in controlled decompression in internal combustion engine operation used for driving compressors, electric generator, and the like, comprising the steps of starting said engine with the decompression control engaged and said engine operating decompressed, increasing the speed of said engine with said decompression control engaged and said engine operating decompressed until said engine reaches a first predetermined speed, while increasing said engine speed above said first predetermined engine speed disengaging said decompression control to a first stage of disengagement to operate said engine compressed, while said engine is operating compressed, increasing said engine speed to an operating speed above said first predetermined speed and disengaging said decompression control to a second stage of disengagement while continuing to operated said engine compressed and, after said engine has completed said compressed operation with said decompression control disengaged, reducing said engine speed to a second predetermined speed above said first predetermined speed but below the operating speed, reengaging said decompression control and, with said engine operating decompressed further reducing the speed of said engine until said engine stops.

**3**. In a decompression control apparatus in an internal combustion engine of the type that a camshaft of the engine is provided thereon with a decompression cam and a decompression weight engaging the cam so that when the engine speed is increased for running thereof, the weight is moved outwardly against the action of a return spring by centrifugal force acting on said weight, and said cam is turned to its inoperative side and released said engine from decompression operation, but when said engine speed is decreased, for stopping, the weight is moved inwardly by said return spring, and said cam is turned to its operative side and said engine is returned to decompression operation, the improvement comprising a subsidiary decompression weight pivoted at one of its ends to said camshaft, said subsidiary decompression weight being separate from said decompression weight but operational therewith when the speed is increased for the running of said engine, for engagement with said decompressioa weight and for outward movement integrally with said decompression weight and for release therefrom when the engine speed is increased to the operation speed.

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**4,590,906**

## FUEL CONTROL MECHANISM IN INTERNAL COMBUSTION ENGINE

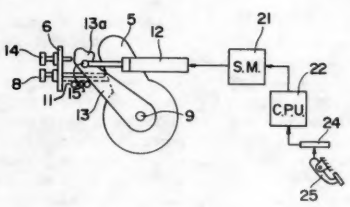
**Makoto Uriuhara, Totsuka, and Junzo Kuroyanagi, Kamakura, both of Japan, assignors to Isuzu Motors, Ltd., Tokyo, Japan**

**Filed Dec. 24, 1984, Ser. No. 685,762**

**Claims priority, application Japan, Dec. 29, 1983, 58-252083**

**Int. Cl.[4] F02M *3/00***

**U.S. Cl. 123—339** **6 Claims**




**1**. An internal combustion engine fuel control apparatus comprising:

a movable member for controlling the supply of fuel to the engine, said movable member being movable in one sense to increase fuel flow and movable in an opposite sense to decrease fuel flow;

control means producing a variable level output for controlling the engine;

operating means controlling movement of said movable member in response to the level of said output;

initiation means coupled to said movable member and said

operating means and operative to initiate said control of said movable member by said operating means at a given level of said output; and said operating means is movable, said initiation means is movable with said operating means and engageable with said movable member to produce movement thereof, and said operating and initiation means are shaped and arranged such that said initiation means undergoes lost motion in response to said output and fails to engage said movable member during initial movement in a first direction and during further movement in said first direction engages said movable member to produce movement thereof in said one sense; and

adjustment means for adjusting said given level of said output from said control means so as to provide thereby a predetermined engine speed for gear shifting operations.

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**4,590,907**

## METHOD OF ADAPTIVELY CONTROLLING INDIVIDUAL CYLINDER FUEL INJECTION QUANTITIES IN ELECTRONICALLY CONTROLLED DIESEL ENGINE AND DEVICE THEREFOR

**Keisuke Tsukamoto, Nagoya; Masaomi Nagase, and Kiyotaka Matsuno, both of Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Feb. 22, 1985, Ser. No. 704,417**
**Claims priority, application Japan, Mar. 2, 1984, 59-41063**
**Int. Cl.[4] F02D *31/00***
**U.S. Cl. 123—357** **7 Claims**

START
E-G TEMP OR FUEL TEMP. IS DETECTED
DSNQ = WNQLT - DNQ
EVERYTIME CORRECTION QUANTITY ΔQ IS DETERMINED IN ACCORDANCE WITH DSNQ AND E-G TEMP OR FUEL TEMP.
INDIVIDUAL CYLINDER CORRECTION QUANTITY ΔQ IS DETERMINED BY INTEGRATING ΔQ
END

1. A method of adaptively controlling individual cylinder fuel injection quantities in an electronically controlled diesel engine, wherein rpm variations of every explosion cylinder are detected from engine speeds and compared with a mean value of the rpm variations of all the cylinders, a correction quantity to be increased or decreased is learned in accordance with an rpm variation deviation or every cylinder until the rpm variations of the cylinders become uniform, and a spill actuator is adjusted for every cylinder, so that engine vibrations due to a dispersion in fuel injection quantity between the cylinders can be reduced, characterized in that said method comprises the steps of:

detecting engine temperature or fuel temperature;

determining an rpm variation deviation from a difference between a mean rpm variation of all the cylinders and the rpm variations of the respective cylinders;

determining an everytime correction quantity in accordance with said rpm variation deviation and said engine temperature or said fuel temperature; and

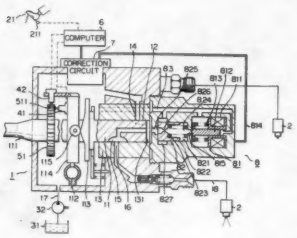
determining an individual cylinder correction quantity by integrating said everytime correction quantities of every cylinder.

**4,590,908**

## FUEL AMOUNT CONTROL SYSTEM IN AN INTERNAL COMBUSTION ENGINE

**Toru Yoshinaga, Okazaki; Yasuyuki Sakakibara, Nishio; Seiko Abe, Okazaki; Kazuhide Watanabe, Toyohashi, and Yukihiro Natsuyama, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan**

**Filed Nov. 1, 1984, Ser. No. 667,344**
**Claims priority, application Japan, Nov. 2, 1983, 58-204950**
**Int. Cl.[4] F02M *59/00***
**U.S. Cl. 123—357** **4 Claims**




1. A system for controlling the amount of fuel to be injected in an internal combustion engine comprising:

a high-pressure pump;

means for spilling fuel from said pump including a spill valve and an electromagnetic valve controlling said spill valve;

correction means for supplying a correction signal related to preliminarily measured variations in said spilling means from other spilling means of same construction; and

processing means for: (1) determining a standard timing for operating said electromagnetic valve based upon engine operating conditions and independent of said variations, (2) modifying said standard timing by said correction signal to generate a control timing specifically adjusted for said spilling means and (3) generating an electric signal in response to said control timing, said electronmagnetic value operating in response to said electric signal so that said spilling means operates at a desired time independent of said variations in said spilling means.

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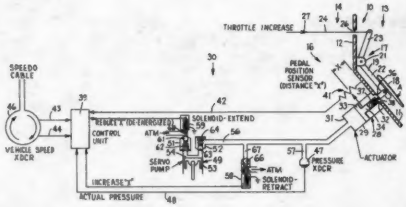
**4,590,909**

## VEHICLE SPEED CONTROL

**Richard P. Heintz, Kalamazoo, Mich., assignor to Deaccelerator Corporation, Kalamazoo, Mich.**

**Filed May 18, 1984, Ser. No. 611,642**
**Int. Cl.[4] F02D *41/14***
**U.S. Cl. 123—360** **29 Claims**




1. A device for maintaining the rotative speed of a rotatable member at a value selected by the operator, comprising:

a pneumatic pumping means operatively connected to said rotatable member;

an inflatable diaphragm member inflatable by said pneumatic pumping means;

a transducer means fastened to the periphery of said inflatable diaphragm member for converting a fluctuating magnetic field into an electrical signal proportional to the frequency of fluctuation and magnitude of the field strength of a magnetic field;

a disk member supported for rotation and having a peripheral portion thereof adjacent but spaced from said transducer means;

means for drivingly rotating said disk at a speed proportional to the rotative speed of said rotatable member;

plural magnet means mounted on said peripheral portion of said disk member whereby said transducer means becomes responsive to the magnetic field of said plural magnet means passing thereby to produce said electrical signal;

means for inflating and deflating said diaphragm member in proportion to the rotative speed of said rotatable member to cause said transducer means to be moved toward and away from said plural magnet means to thereby increase and decrease the magnitude of the field strength in conjunction with an increase and decrease in frequency of the fluctuations of said magnetic field whereby said electrical signal is rendered proportional to the rotative speed of said rotatable member; and

means responsive to said electrical signal for maintaining said rotative speed of said rotatable member at said selected value.

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**4,590,910**

## LIQUID FUEL INJECTION PUMPING APPARATUS

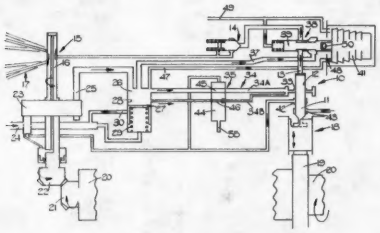
**Edward R. Lintott, and Kenneth M. Harris, both of London, England, assignors to Lucas Industries Public Limited Company, Birmingham, England**

**Filed Nov. 9, 1984, Ser. No. 670,025**

**Claims priority, application United Kingdom, Nov. 23, 1983, 8331246**

**Int. Cl.[4] F02M *39/00***

**U.S. Cl. 123—458** **6 Claims**



1. A liquid fuel injection pumping apparatus for supplying fuel to an internal combustion engine, the apparatus comprising a high pressure reciprocable plunger fuel injection pump having an outlet connected in use, to an injection nozzle of an associated engine, a low pressure supply pump for supplying fuel under pressure to the high pressure pump during the filling periods thereof, passage means connecting the supply pump to an inlet of the high pressure pump, an electrically controlled spill valve operable to divert fuel at high pressure from the high pressure pump thereby to control the amount of fuel supplied through said outlet, a valve in said passage means having a valve member, said valve being operable to provide a variable restriction to fuel flow through said passage means, and mechanically operated means operable in conjunction with said valve to close said spill valve, said passage means including first and second passages and the valve member of said valve being provided with corresponding drillings, the first passage and the respective drilling providing for substantially unrestricted flow of fuel to the high pressure pump in normal operation and in a first position of the valve, drillings in the valve being out of register with said passages in a second position of the valve, said second passage and the respective drilling providing for a variable but restricted flow of fuel when the valve is moved from the second position to a third position.

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**4,590,911**

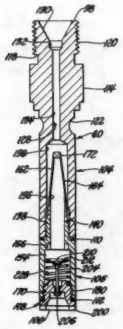
## FUEL INJECTION VALVE ASSEMBLY

**Robert Sciotti, Warren, and Dean E. Mocko, Mount Clemens, both of Mich., assignors to Colt Industries Operating Corp., New York, N.Y.**

**Continuation of Ser. No. 572,560, Jan. 20, 1984, abandoned. This application Mar. 27, 1985, Ser. No. 716,407**

**Int. Cl.[4] F02M *39/00*; F05B *1/00***

**U.S. Cl. 123—468** **36 Claims**



1. A fuel injector nozzle assembly comprising a tubular elongated housing having a first inlet end and a second discharge end, said housing comprising first second and third housing sections detachably secured to each other in a series arrangement whereby said first housing section has a first end comprising said inlet end and a second end detachably connected to a first end of said second housing section, wherein said second housing section comprises a second end which is opposite to said first end of said second housing section and detachably secured to a first end of said third housing section, wherein said third housing section has a second end opposite to said first end of said third housing section and comprises said second discharge end, fuel flow passage means extending axially through said first second and third housing sections, fuel filter means, said fuel filter means being operatively carried by said second housing section, said fuel filter means being situated in said fuel flow passage means and extending at least partly into said first housing section when said first and second housing sections are detachably secured to each other via said second end of said first housing section and said first end of said second housing section, wherein said fuel flow passage means comprises a fuel discharge orifice operatively carried by said third housing section, a valve, a valve stem, a movable spring seat, said valve being operatively carried generally at one operative end of said valve stem, said movable spring seat being operatively engaged at a second operative end of said valve stem generally opposite to said first operative end of said valve stem, and spring means situated generally in said fuel flow passage means, said spring means comprising a first spring end operatively engaging said third housing section and a second spring end operatively engaging said movable spring seat, said spring means being effective to resiliently hold said valve closed against said fuel discharge orifice until such time as the pressure of the fuel within said fuel flow passage means causes an opening force against said valve exceeding the preload force of said spring means.

## 4,590,912
## AIR-FUEL RATIO CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINES

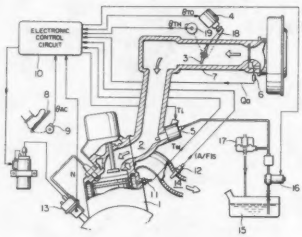
**Takeshi Atago, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 16, 1984, Ser. No. 672,367**

**Claims priority, application Japan, Nov. 21, 1983, 58-219169; Nov. 28, 1983, 58-222245**

**Int. Cl.⁴ F02M *7/04***

**U.S. Cl. 123—478** **4 Claims**




1. In an electronic air-fuel ratio control apparatus for an internal combustion engine including a throttle actuator for varying the opening of a throttle valve arranged in an intake passage of said engine and at least one fuel injection valve positioned upstream or downstream of said throttle value to inject fuel, thereby controlling the air-fuel ratio of a mixture supplied to the combustion chambers of said engine, the improvement comprising:

first sensor means for detecting the rotational speed of said engine and for producing an output signal representative of said rotational speed;

second sensor means for detecting an operation command quantity by a driver and for producing an output signal representative of said quantity, including means for detecting an acceleration command by the driver;

first computing means responsive to output signals from said first and second sensors for computing at periodic intervals a quantity of fuel to be injected from said fuel injection value; and

second computing means responsive to said fuel injection quantity computed by said first computing means at each of said periodic intervals for computing an optimum throttle opening for the computed quantity of fuel to be injected and for driving said throttle actuator to attain said optimum throttle opening independent of the quantity of the driver operation command, including means responsive to detection of said acceleration command by said second sensor means for driving said throttle actuator with a predetermined delay to provide fuel enrichment during acceleration.

## 4,590,913
## FUEL INJECTION PUMP

**Werner Faupel, Gerlingen, and Gerald Höfer, Weissach-Flacht, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

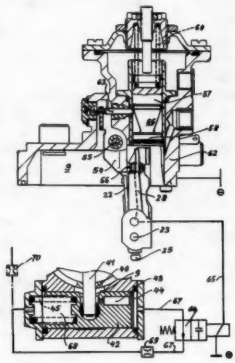
**Filed Jun. 3, 1985, Ser. No. 740,169**

**Claims priority, application Fed. Rep. of Germany, Jun. 22, 1984, 3423212**

**Int. Cl.⁴ F02M *59/20***

**U.S. Cl. 123—502** **11 Claims**

1. A fuel injection pump comprising a housing, a rotatable cam drive supported in said pump housing arranged to effect the pumping movement of a least one pump piston to vary the supply onset and thus the injection onset relative to its rotating portion by means of an adjusting piston acted upon counter to a restoring force by hydraulic pressures of a feed pump arranged to generate an rpm-dependent pressure, an rpm governor provided with a member adjustable in accordance with load and a correspondingly displaceable stop means cooperating with said member and defining the full-load quantity at a given time arranged to determine the injection quantity, said adjustable member arranged to move away from said stop means upon a load change in the direction of a decreasing load, and an electric switch associated with said stop arranged to trigger a magnetic valve which varies the pressures acting upon said adjusting piston thereby causing the injection onset to be shifted in the "late" direction.



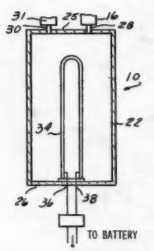
## 4,590,914
## METHOD FOR INCREASING FUEL EFFICIENCY

**Leon Rosky, Flint; Gabriel T. Anslow; Daniel F. Spaniola, both of Swartz Creek, and Marvin H. Weintraub, West Bloomfield, all of Mich., assignors to Optimizer, Limited, Flushing, Mich.**

**Filed Jun. 11, 1984, Ser. No. 619,586**

**Int. Cl.⁴ F02M *31/00***

**U.S. Cl. 123—557** **9 Claims**




1. A device for increasing fuel efficiency of a liquid fuel comprising:

a first hollow housing, the housing having an inlet port for the liquid fuel;

a first metallic medium disposed in the housing and which contacts the liquid fuel permitting minute amounts of the medium to dissolve therein;

a second hollow housing, having an outlet port for issuing liquid fuel therefrom;

a second metallic medium disposed in the second housing and which contacts the liquid fuel permitting minute amounts of the medium to dissolve therein; and

means for communicating between the first housing and second housing to permit the liquid fuel to flow from the first housing into the second housing, a source of heat for maintaining the temperature within the housings at a temperature ranging from about the ambient to about less

than 100° C., and wherein the fuel entering the device and exiting the device is in a liquid phase.

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**4,590,915**

## MULTI-CYLINDER FUEL ATOMIZER FOR AUTOMOBILES

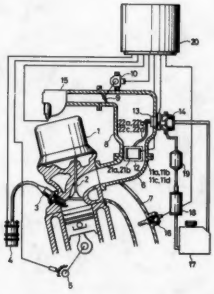
**Teruo Yamauchi, and Yoshishige Oyama, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 13, 1984, Ser. No. 670,890**

**Claims priority, application Japan, Nov. 10, 1983, 58-211356**

**Int. Cl.⁴ F02M *29/00***

**U.S. Cl. 123—590** **14 Claims**



**1**. In a fuel supply system of an automobile engine, a multi-cylinder fuel atomizer comprising an electromechanical transducer disposed between a concentrated cylinder arranged in a suction passage and respective suction pipes independently branched from said concentrated cylinder to corresponding cylinders, a pair of ring vibrators, a pair of horns having the ring vibrators at the distal ends thereof, the other ends of the horns tightly contacting said electromechanical transducer such that said vibrators are partly exposed to said suction pipes, and a fuel injector arranged upstream of said electromechanical transducer to inject fuel to said vibrators.

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**4,590,916**

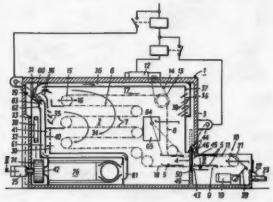
## BAKING OVEN

**Helmut König, Ursprungweg 70 - 72, Graz, Austria (A-8045)**

**Filed Jan. 17, 1985, Ser. No. 693,026**

**Int. Cl.⁴ A21B *1/00***

**U.S. Cl. 126—21 A** **16 Claims**



**1**. A baking oven comprising a housing, a baking chamber surrounded by the housing and having a charging opening for the baking good, plate members for carrying the baking good, guide means for guiding the plate members in a stepwise movement and in an endless path substantially arranged within the baking chamber, blowing means for blowing hot air into the baking chamber through at least one air supply opening leading into the baking chamber, heating means for heating this air which is recycled from the baking chamber to the blowing means, comprising a by-pass-channel by-passing said baking chamber and leading back to said blowing means, a closure means for the charging opening, a charging and discharging station for the baking good, said station being located outside of the baking chamber, a branch of the endless path of the guide means for the plate members being passed through said charging openings to said charging and discharging station, a change-over means provided within the flow-path of the air flowing from the blowing means to the baking chamber for selectively feeding the air either into the baking chamber or into the by-pass-channel, and means for actuating these change-over means in timely relationship with steps of the movement of the plate members and with actuation of said closure means for the charging opening.

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**4,590,917**

## SPACE HEATER FOR SMALL ROOMS

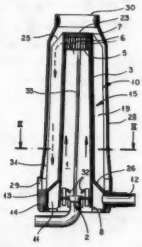
**Wilhelm Mossbach, Kirchseeon, Fed. Rep. of Germany, assignor to Philipp Kreiss GmbH & Co. Truma-Geratebau, Putzbrunn, Fed. Rep. of Germany**

**Filed Jun. 11, 1984, Ser. No. 618,964**

**Claims priority, application Fed. Rep. of Germany, Jun. 10, 1983, 3321116**

**Int. Cl.⁴ F24C *3/00***

**U.S. Cl. 126—90 R** **10 Claims**



**1**. A space heater for small rooms, comprising:

a generally cylindrical combustion pipe, centered on a vertical axis and provided with an open lower end;

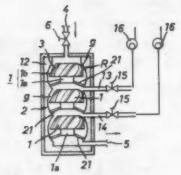
a burner entering said combustion pipe by said lower end;

a heat exchanger constituted by a jacket coaxially surrounding said combustion pipe, said jacket being of undulating cross-section over at least a major part of its height and forming a multiplicity of inwardly open first vertical channels alternating with as many outwardly open second vertical channels, said inwardly open first channels communicating near their upper ends with said combustion pipe and with their lower ends passing into an annular space completely surrounding said combustion pipe at the level of said burner and said jacket having a cylindrical circumferential wall defining said space and connected to an exhaust means for combustion gases, said outwardly open second channels communicating at least at their upper and lower ends with the surrounding atmosphere, said outwardly open second channels ending above said annular space and being separated from the inwardly open first channels and said annular space by outwardly sloping bottom segments, the cylindrical circumferential wall of said annular space being formed approximately in extension of outwardly directed boundaries of said jacket, said jacket being spacedly surrounded over at least part of its height by a generally cylindrical outer wall forming therewith an annular conduit open at the bottom and at the top to the surrounding atmosphere for enabling a circulation of ambient air through said second channels.

## 4,590,918
## HEAT GENERATING APPARATUS BY USE OF MULTISTAGE ROTARY MEANS

Nobuyoshi Kuboyama, 28-9-1, Shimomiyamori, Aza, Miyamori-Mura, Kamihei-Gun, Iwate-ken, Japan

Filed Aug. 16, 1983, Ser. No. 523,692
Claims priority, application Japan, Jul. 20, 1983, 58-132542
Int. Cl.[4] F24C 9/00
U.S. Cl. 126—247 8 Claims



1. A heat generating apparatus by use of multistage rotary means comprising:

a tubular casing having an air suction inlet and an air discharge outlet and at least first and second rotary means disposed in said tubular casing, said first rotary means receiving air from said air suction inlet and delivering air at a first different pressure to said second rotary means, said second rotary means delivering air at a second different pressure to said air discharge outlet, an air friction heat generating area formed by a slight gap between a rotation area of each of said first and second rotary means and said casing whereby suctioned air is heated in said air friction heat generating areas while reducing or pressurizing the air pressure within the casing at a continuously balanced level and means for controlling a volume of air flow through at least one of said inlet and said outlet to a volume of air flow effective to maintain said air pressure within said casing at said continuously balanced level and for discharging friction heated air from said air discharge outlet;

each of said at least first and second rotary means including an electric motor and a predetermined number of rotary vanes;

said at least first and second rotary means being disposed coaxially in said tubular casing; and

each of said at least first and second rotary means being actuated by its respective electric motor.

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## 4,590,919
## COOKING VESSEL WITH COVER GUARD

Toni Späni, Oberengstringen, and Rita Lichtenstein, Zurich, both of Switzerland, assignors to Lispa R. Lichtenstein, Zurich, Switzerland

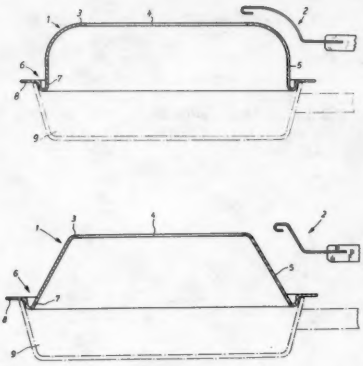
Continuation-in-part of Ser. No. 575,156, Jun. 30, 1984, abandoned. This application Jan. 14, 1985, Ser. No. 691,718
Claims priority, application Switzerland, Feb. 4, 1983, 650/83
Int. Cl.[4] A47J 27/00
U.S. Cl. 126—382 7 Claims

1. A cooking apparatus comprising: a cooking vessel having a bottom, a wall adjacent said bottom and a rim at the upper edge of said wall and a cover guard including:

a hood having a sidewall with a bottom portion which rests near the rim of said cooking vessel when said cover guard is placed on said vessel, said sidewall supporting a top section provided with an opening to allow access to said cooking vessel;

a grooved section formed by the bottom portion of said sidewall and a leg projecting upwards from the bottom portion of said sidewall; and

a first level section integral with said leg and projecting laterally outward from said grooved section so that when said cover guard is placed on said vessel in an upright position said first level section is in resting engagement upon the rim of said cooking vessel and when said cover guard is placed on said vessel in an inverted position said



first level section is in resting engagement upon the rim of said cooking vessel and the top section of said cover guard is supported above the bottom of said cooking vessel.

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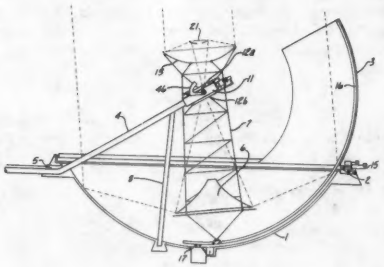
## 4,590,920
## FOCUSSING SOLAR COLLECTOR

Garrett M. Sainsbury, 10 Waratah Avenue, Dalkeith, Western Australia, Australia

Filed May 16, 1984, Ser. No. 610,846
Claims priority, application Australia, May 17, 1983, PF9404
Int. Cl.[4] F24J 3/02
U.S. Cl. 126—425 19 Claims



1. A solar collector comprising a substantially hemispherical reflective concave surface, the diametric axis of said surface being inclined at an angle from the horizontal substantially equal to the angle of latitude of the location of the solar collector, said surface comprising a fixed lower portion and a rotatable upper portion, a drive for said upper portion for maintaining said surface substantially constantly directed towards the sun during its movement; a caustical conical concentrator located at the focus of said hemispherical reflective concave surface and having a concentrated second focus for radiation reflected onto its surface from said hemispherical reflective concave surface, a collector located at the second focus, said custical conical concentrator being mounted to rotate about a substantially North-South axis passing through said second focus and being driven by said drive for movement of said caustical conical concentrator around said lower portion in response to movement of said upper portion and for relative upward movement over said reflective concave surface with

movement of the sun for deflection of incident solar radiation at said second focus.

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**4,590,921**

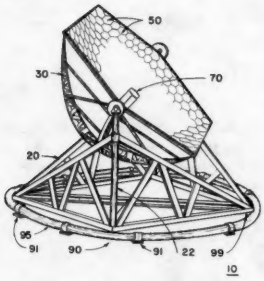
## PARABOLIC REFLECTOR

**John A. Dane, 8823 Shellie La., Boise, Id. 83704**

**Filed Nov. 7, 1984, Ser. No. 668,898**

**Int. Cl.[4] F24J *2/12*; G02B *7/18***

**U.S. Cl. 126—438** **6 Claims**




1. Parabolic reflector apparatus comprising:

support structure;

a parabolic dish framework mounted upon said support structure;

one or more support panels mounted on said framework, each of said support panels defining upon its upper surface a plurality of recesses, each of said recesses provided with attachment means for attaching one of a plurality of reflectors to said support panels;

a collector mounted on said framework; and

a plurality of reflectors, each reflector formed of a bowl-shaped construction having a concave reflecting surface terminating in a rim defining a polygon, the sides of the rims of each reflector registerable with the sides of the rims of adjacent reflectors.

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**4,590,922**

## USE OF FERROMAGNETIC, PARAMAGNETIC AND DIAMAGNETIC PARTICLES IN THE TREATMENT OF INFECTIOUS DISEASES

**Robert T. Gordon, 4936 W. Estes, Skokie, Ill. 60077**

**Filed Aug. 19, 1983, Ser. No. 524,844**

**Int. Cl.[4] A61B *19/00***

**U.S. Cl. 128—1.3** **26 Claims**

1. A method of treatment of infectious disease organisms comprising:

providing to said organism minute, inductively heatable, intracellularly-localizable particles of a size less than 1 micron, and

inductively heating said particles by the application of an alternating electromagnetic field for a period of time sufficient to effect a rise in intracellular temperature to a minimum necessary to kill said organism.

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**4,590,923**

## ARTHROSCOPE-VIDEO CAMERA ASSEMBLY

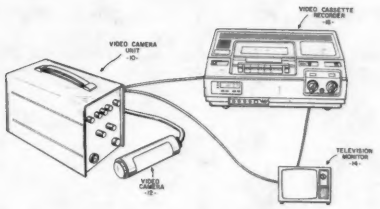
**Robert S. Watanabe, 11645 Wilshire Blvd., Ste. 701, Los Angeles, Calif. 90024**

**Filed Apr. 18, 1983, Ser. No. 486,026**

**Int. Cl.[4] A61B *1/06***

**U.S. Cl. 128—6** **13 Claims**

1. A video arthroscope assembly comprising: a video camera; a housing for removably receiving said video camera with the video camera being enclosed within said housing, said housing being formed of a material capable of being sterilized; a video camera electronic unit for receiving and amplifying video signals from said video camera; a television monitor; cable means connecting said television monitor to said video camera electronic unit; a first electric cord connecting said video camera electronic unit to said video camera in said housing for introducing video signals from said camera to said electronic unit to be processed therein; an arthroscope; a mounting bracket for detachably receiving said arthroscope,




said mounting bracket being detachably mounted to one end of said housing and optically coupled to the interior of said housing for introducing optical images from the arthroscope to the video camera within said housing to be converted by the video camera into corresponding video signals; an arthroscopic light; and means for detachably attaching said arthroscopic light to said mounting bracket so that light from said arthroscopic light may pass through said mounting bracket to said arthroscope.

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**4,590,924**

## ENDOSCOPE SYSTEM

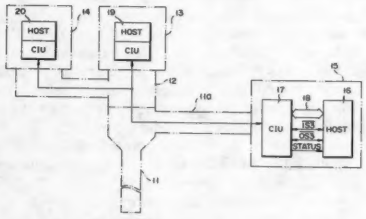
**Kouji Tanikawa; Koichi Matsui; Akira Taniguchi; Atsushi Amano; Masahide Kanno, and Yutaka Takahashi, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Sep. 11, 1984, Ser. No. 649,527**

**Claims priority, application Japan, Sep. 21, 1983, 58-174709; Oct. 7, 1983, 58-187958; Oct. 7, 1983, 58-187959; Oct. 7, 1983, 58-187960**

**Int. Cl.[4] A63B *1/06***

**U.S. Cl. 128—6** **14 Claims**




1. An endoscope system comprising:

an endoscope which is inserted into a body cavity;

an endoscope camera mounted on said endoscope;

a light source device coupled to said endoscope;

data communication means including at least two communication units which are provided respectively in at least two of said endoscope, said endoscope camera and said light source device, one of said units serving as a master station and another of said units serving as a slave station, at least one of said units including means for setting same into a data reception waiting state;

data error detection means for detecting a data error in data communication by said data communication means, said data error including a non-response data error and an abnormal condition data error; and

error recovery means for performing an error recovery

operation in response to data error detection by said data error detection means, said error recovery means including means for temporarily releasing a data reception waiting state of said at least one unit of said data communication means due to a data transmission error, thereby preventing said at least one unit from being kept in a data reception waiting state waiting for receipt of data.

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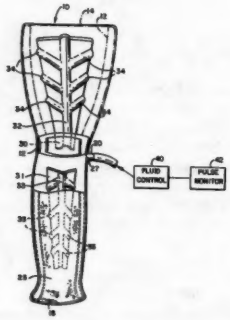
**4,590,925**

## SYSTEM FOR PROMOTING THE CIRCULATION OF BLOOD

**Richard S. Dillon, 150 Mill Creek Rd., Ardmore, Pa. 19003**

**Filed Aug. 24, 1983, Ser. No. 526,040**
**Int. Cl.[4] A61H 9/00**
**U.S. Cl. 128—24 R** **18 Claims**




1. An apparatus for promoting circulation of blood through an extremity comprising:

(A) an inflatable enclosure having a resilient flexible wall for covering at least a portion of the extremity and a deformable outer wall;

(B) fluid supply means for the enclosure for supplying a fluid flow to the enclosure to inflate the enclosure;

(C) retaining means for the enclosure outer wall for retaining the enclosure so that inflation of the enclosure applies pressure on the covered portion extremity;

(D) guide means positioned externally of the enclosure for confronting the outer surface of the outer wall of the enclosure cooperable with the fluid means to cause, during inflation of the enclosure, the outer wall to deform in a predetermined manner to form channel means internally of the enclosure throughout its length providing flow passages in the enclosure extending from the fluid supply means to selected distribution points within the enclosure to enable inflation of the enclosure substantially simultaneously throughout its length;

(E) exhaust means for said enclosure for exhausting fluid from the enclosure to reduce pressure on the extremity; and

(F) control means for the fluid supply means and the exhaust means for controlling the application of pressure on the extremity in a predetermined manner.

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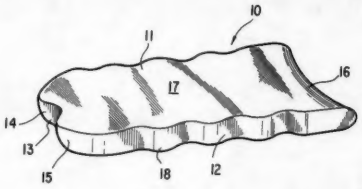
**4,590,926**

## HAND-HELD MASSAGER

**Olivier Courtin, 7, rue Guénégaud, 75006 Paris, France**

**Filed Sep. 8, 1982, Ser. No. 416,058**
**Claims priority, application France, Mar. 16, 1982, 82 04440**
**Int. Cl.[4] A61H 7/00**
**U.S. Cl. 128—67** **11 Claims**

9. Massager, designed for back-massaging, comprising a substantially parallelepiped plate having two flat main faces, two lateral faces and two end faces, respectively front and back, and in which the front end face is curved in a contour having two projections which are convex in plan view which are respectively connected to the lateral faces, each projection having the shape of a thumb and framing a central concave part, the massager being adapted to be hand-grasped at its




longitudinal lateral faces in order to move the plate along a person's back with the thumb-shaped convex parts on both sides of the spine to effect massage of the paravertebral muscles.

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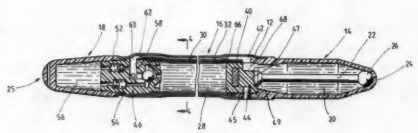
**4,590,927**

## UNITARY, INFLATABLE PENILE PROSTHESIS SYSTEM

**Christopher H. Porter, Minnetonka, and Charles C. Kuyava, Brooklyn Center, both of Minn., assignors to American Medical Systems, Inc., Minnetonka, Minn.**

**Filed Feb. 25, 1985, Ser. No. 705,508**
**Int. Cl.[4] A61F 5/00**
**U.S. Cl. 128—79** **33 Claims**



1. A unitary inflatable penile prosthesis implantable within at least one corpus cavernosum of the penis, said prosthesis comprising:

an implantable, broadly tubular enclosure;

a generally tubular pressurizable chamber section defined medially within said enclosure, said chamber section including a substantially nondistensible tubular portion and tubular sleeve concentric with said tubular portion, said tubular portion being expandable from a flaccid to an erect state when the interior volume of said tubular portion is filled substantially to capacity;

a fluid containing reservoir defined within said enclosure in series along the length of said enclosure with respect to said chamber section;

a manually compressible pump defined within said enclosure in series along the length of said enclosure with respect to said chamber section, said pump adapted for fluid communication with said tubular portion, said reservoir and said pump being located on opposite sides of said chamber section; and

a passageway fluidically connecting said reservoir and said pump, said passageway being maintained in fluid isolation from said chamber section, said pump adapted to pump fluid to said tubular portion from said reservoir such that the volume of said chamber section increases as said chamber section is transformed from its flaccid to its erect state.

## 4,590,928
## SURGICAL IMPLANT

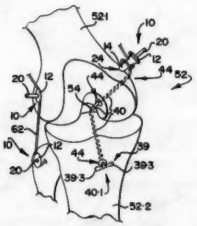
**Michael S. Hunt, Edenvale; Peter J. Mundell, Verwoerdburg, and Angus E. Strover, Halfway House, all of South Africa, assignors to South African Invention Development Corporation, Pretoria, South Africa**

**Filed Sep. 22, 1981, Ser. No. 304,508**

**Claims priority, application South Africa, Sep. 25, 1980, 80/5957**

**Int. Cl.⁴ A61F *1/00***

**U.S. Cl. 128—92 D** **13 Claims**




1. A surgical implant comprising a stud and pin, said stud having an elongated tubular cylindrical body and an outwardly facing outer cylindrical surface, said body being smooth in both the longitudinal and the circumferential direction and having at one end thereof an enlarged head and an opposite end having means for enabling said body to undergo radially outward expansion; a longitudinal passage formed in said body connecting each of said ends wherein said passage is smooth and continuous; said pin being elongated and having a smooth outer surface such that the pin is slidable into said passage from said end having the head thereby to cooperate with said means for enabling said body to expand radially outwardly, to expand said body; said head being concavely radiused and said stud and said pin being of biocompatible materials, said body containing carbon fibres wherein said fibres are oriented longitudinally relative to the longitudinal axis of said stud.

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## 4,590,929
## TOOLS FOR ORTHOPAEDIC SURGERY AND THE LIKE

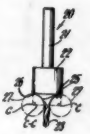
**Harvey A. Klein, 1000-E. 19th St., Brooklyn, N.Y. 11230**

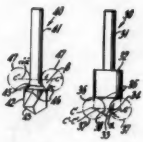
**Filed May 3, 1983, Ser. No. 491,244**

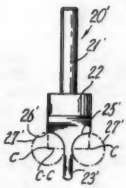
**Int. Cl.⁴ A61F *5/04*; B23B *51/00***

**U.S. Cl. 128—92 E** **10 Claims**

1. A rotating radius cutter means forming a radius to remove stress raising corners of an aperture formed in a bone fragment for passing a wire therethrough in the formation of a wire connection between bone fragments, said radius cutter means comprising a blade having a subtended arc of an angle of at least about 90°, with said blade being adapted to cuttingly engage said external stress raising corners of said aperture to effect such removal with the formation of a curve from the interior of said aperture to the outer surface of said bone fragment, wherein said blade, at the outer periphery thereof, which engages said outer surface, has a non-cutting flat surface for a distance sufficient to prevent gouging of the outer surface of said bone by said blade, and wherein said radius cutter means further embodies positioning means, for properly positioning








said blade for effecting said removal, comprising a non-cutting pilot sized to snugly fit within said aperture.

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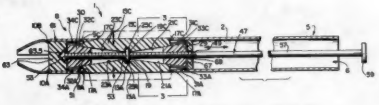
## 4,590,930
## FIXATION DEVICE AND PROCESS FOR AN INTRAMEDULLARY NAIL

**Lloyd A. Kurth, 255 Randolph Rd., Morgantown, W. Va. 26505, and J. David Blaha, Morgantown, W. Va., assignors to Lloyd A. Kurth, Morgantown, W. Va.**

**Filed Jun. 22, 1983, Ser. No. 506,779**

**Int. Cl.⁴ A61F *5/04***

**U.S. Cl. 128—92 BC** **21 Claims**



1. A bone fixation device installable within a hollow, intramedullary nail having an open end, comprising:

(a) at least one blade member having a top portion registrable with a blade slot provided in the wall of the nail, and a bottom surface including a rail slot;

(b) at least one wedge member having an inclined top surface for transmitting a blade-extending force to said bottom surface of said blade member, and a rail which is slidably engageable with said slot for maintaining alignment between said top wedge surface and said blade member, and

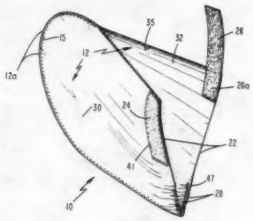
(c) an elongated member for applying a blade-extending force to said wedge member.

4,590,931

## SCROTUM PROTECTING GUARD

Louis E. Kidwell, Jr., Shreveport, La., assignor to Practical Products, Inc., El Paso, Tex.

Filed Oct. 22, 1984, Ser. No. 663,956
Int. Cl.[4] A61F 5/40, 5/44
U.S. Cl. 128—162 19 Claims



1. A scrotum protecting guard for male use, comprising a sheath formed of side walls being secured together along edges thereof except for at least one opening formed along one side of said walls and between edges thereof through which the user's scrotum is inserted into the sheath; and means attached to edges of said side walls for clamping said opening to the genitals to retain the guard in fixed position, said means including a first fastening strip containing resilient hook fasteners disposed along one edge of the opening and a second fastening strip containing resilient loop fasteners disposed along an opposite edge of the opening engageable with the hook fasteners to provide a snug fit.

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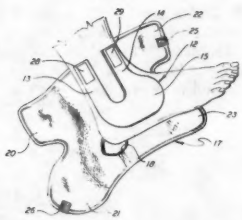
4,590,932

## ANKLE-SPRAIN EDEMA-CONTROL BOOT ASSEMBLY

Gary B. Wilkerson, 406 Perkins Ave., Danville, Ky. 40422

Filed May 14, 1984, Ser. No. 610,269
Int. Cl.[4] A61F 13/06
U.S. Cl. 128—166 12 Claims



1. A boot assembly applicable to either the left or right ankle and foot for applying compression to control edema from a sprain comprising

(a) substantially U-shaped pad means of compressible material comprising two legs defining a channel and a connecting portion disposable on the foot with the malleolus between the legs at the bottom of the channel and with the connecting portion on the top of the foot below the malleolus;

(b) a pliable fabric boot element disposable over the pad means around the ankle and foot from behind with a sole portion of the boot element underlying the foot and comprising

i. upper and lower flaps on one side and upper and lower flaps on the other side of the front of the boot element,

ii. one of the upper flaps being an inner flap disposable against the ankle and the other of the upper flaps being an outer flap adapted to overlap and be secured to the upper inner flap,

iii. the lower flap on the same side as the upper outer flap being an inner flap disposable over the connecting portion of the pad means and the other of the lower flaps being an outer flap adapted to overlap and be secured to the lower inner flap in a direction opposite the overlap of the upper outer flap so as to compress the top of the boot and its area below the malleolus with a squeezing action opposed by the boot sole portion underlying the foot; and

(c) releasable securing means on the upper and lower outer flaps for securing them to the respective upper and lower inner flaps.

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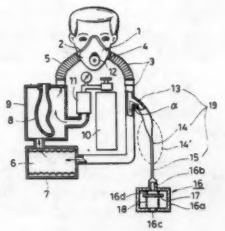
4,590,933

## STATIC PRESSURE AUTOMATIC CONTROL DEVICE FOR CLOSED CIRCUIT RESPIRATOR

Kazu Itoh, Tokyo, Japan, assignor to Itoh Seiki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 21, 1984, Ser. No. 685,068
Claims priority, application Japan, Jan. 13, 1984, 59-3128[U]
Int. Cl.[4] A62B 7/00
U.S. Cl. 128—205.24 2 Claims



1. A static pressure automatic control device for respirators of closed-circuit type comprising an exhalation system including a mask and a cleaning cannister for attenuating respiratory dynamic pressure, and exhaled air passage branched out of said exhalation system extending from said mask to said cleaning cannister, a static pressure discharge valve means connected to said exhaled air passge for opening when the static pressure within said exhaled passage has exceeded a preset value to let out the gas inside the system said exhaled air passage being a pipe, a bag made of an elastic material connected to said pipe, and a tube of an inner diameter which is smaller than that of said pipe connected to said bag.

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4,590,934

## BIPOLAR CUTTER/COAGULATOR

Jerry L. Malis, 1030 Union Meeting Rd., Blue Bell, Pa. 19422; Leonard I. Malis, 219-44 Peck Ave., Queens, N.Y. 11427; Robert R. Acorcey, Blackwood, N.J., and David Solt, Willow Grove, Pa., assignors to Jerry L. Malis, Blue Bell, Pa. and Leonard I. Malis, Queens, N.Y.

Filed May 18, 1983, Ser. No. 495,906
Int. Cl.[4] A61B 17/36
U.S. Cl. 128—303.14 92 Claims

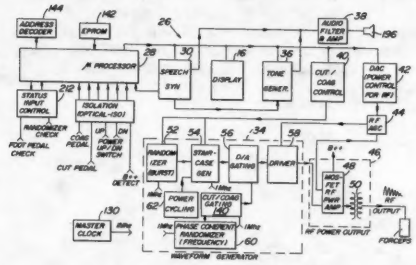
1. Electrosurgical apparatus, comprising:

a bipolar electrode,

means for electronically synthesizing an aperiodic sequence of uniform-width bursts of a high frequency signal,

means for impressing substantially identical decaying amplitude envelopes on said bursts, each of said envelopes having a predetermined rate of change from a preselected initial amplitude, and

means for applying said impressed bursts to said electrode.




## 4,590,935

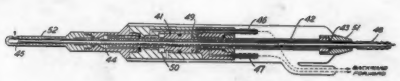
## CONTROL SYSTEM FOR INTRAOCULAR SURGICAL DEVICE

**Domenico Ranalli, Rome, Italy, assignor to Optikon Oftalmologia, S.p.A., Rome, Italy**

**Division of Ser. No. 317,115, Nov. 2, 1981, Pat. No. 4,449,550. This application Feb. 8, 1984, Ser. No. 578,076**

**Int. Cl.[4] A61B *17/32***

**U.S. Cl. 128—305** **1 Claim**



1. A surgical device including a control system of the type having two alternately energized power lines, said device comprising a housing having a central passage and a piston chamber, a cutting member reciprocally mounted in said passage, a piston in said piston chamber connected to said cutting member, a first and second air path adapted to be connected to respective ones of said alternately energized power lines to control movement of the piston, said first air path communicating with said piston chamber on one side of said piston and said second air path communicating with said piston chamber on the other side of said piston, whereby the reciprocation of said cutting member is controlled by the alternate application of air to the opposite ends of said piston, said control system including gas input means receptive of a supply of high pressure gas, first and second actuable one-way valves connected in series with the gas input means, with the input of the first valve connected to the output of the gas input means and the output of the second valve vented to the atmosphere, wherein each valve is actuable between a closed state and an open state wherein the input and output are in communication; five-way actuatable valve means for controlling the flow of a fluid having an input connected to the series connection between the first and second valves, two outputs vented to the atmosphere and two outputs connectable to said surgical device, wherein the valve means is actuable between a first state wherein the input is in communication with one device output and the other device output is in communication with one venting output and a second state wherein the input is in communication with the other device output and the one device putput is in communication with the other venting output; control means for maintaining the first and second valves in the closed and open states respectively and responsive to the connection of said device to said control system for thereafter reversing said states and for selectively actuating the five-way valve means between the first and second states only when the first valve is open and the second valve is closed and wherein said first and second air paths of said surgical device are connectable to said five-way valve means such that said cutting member is affected by the alternate application of high pressure gas to said first and second air paths.

## 4,590,936

## MICROSURGICAL INSTRUMENT

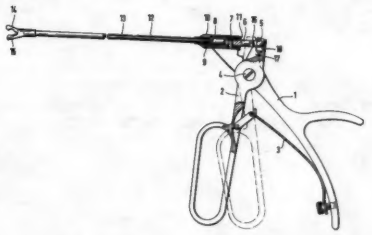
**Reinhold Straub, Schramberg, and Eugen Eberhard, Mülheim, both of Fed. Rep. of Germany, assignors to Ewald Hensler, Immendingen, Fed. Rep. of Germany**

**Filed Feb. 1, 1984, Ser. No. 575,865**

**Claims priority, application Fed. Rep. of Germany, Feb. 2, 1983, 3303349**

**Int. Cl.[4] A61B *17/32***

**U.S. Cl. 128—305** **20 Claims**



1. A microsurgical instrument having a stationary jaw part that is connected via a tube with a stationary handle part, and having a jaw part that is rotatable toward the stationary jaw part, the rotatable jaw part being provided on a rotating rod rotatably and coaxially supported in the tube, wherein the posterior end of the rotating rod is connected with an axially continuous, helical inclined curve with which a tappet is in engagement, the tappet being axially displaceable in a nontwisting manner by means of an actuating handle part articulated such that it is pivotable on the stationary handle part, characterized in that the inclined curve is embodied as a slit of a sleeve coaxially receiving the tappet and rotatably supported in the posterior end of the tube, that the slit is engaged by a radial pin of the tappet, that the stationary handle part and the actuating handle part are disposed substantially at right angles to the tube, that the actuating handle part is articulated in scissor-like fashion on the stationary handle part, its shorter, free lever arm extending behind the posterior end of the tube, and that the posterior end of the tappet is attached in a nontwisting manner on the free lever arm of the actuating handle part and is displacable in the longitudinal direction of the actuating handle part.

## 4,590,937

## NONMETALLIC SURGICAL CLIP

**Jose C. Deniega, Brookfield, Conn., assignor to American Cyanamid Company, Stamford, Conn.**

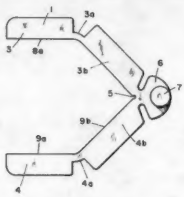
**Filed Jan. 7, 1985, Ser. No. 689,342**

**Int. Cl.[4] A61B *17/12***

**U.S. Cl. 128—325** **5 Claims**

2. A nonmetallic synthetic bioabsorbably surgical clip having two separate parts, the first part comprising two symmetrical arms joined together at an apex, a protrusion adjacent said apex and opposite the proximal ends of said arms, a weakened portion and a bend in each arm, said bend being at said weakened portion and the amount of said bend being such that the distal ends of said arms are in an essentially parallel relation-

ship, and the second part comprising a U-shaped member for approximating the cooperating surfaces of said arms, wherein



the distal end of said U-shaped member is contacting said protrusion.

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**4,590,938**

## MEDICAL RETRIEVER DEVICE

**Joseph W. Segura, 810 60th Ave. SW., Rochester, Minn. 55902, and James F. Vance, Sr., R.R. 2 Box 10, Spencer, Ind. 47460**

**Filed May 4, 1984, Ser. No. 607,219**
**Int. Cl.[4] A61B *17/22***
**U.S. Cl. 128—328** **6 Claims**



1. In a medical retriever device sized and adapted for use through the working channel of an endoscope for removing stones and the like from the kidneys, ureter or biliary duct,

said device comprising

an elongated, narrow sheath,

a basket of relatively large diameter extendible from the distal end of said sheath and collapsible when withdrawn into said sheath, said basket defined by a multiplicity of spaced apart, outwardly bowed spring arms which extend generally axially of said sheath and are joined at respective distal and proximal ends of said basket,

and remote means to project, retract and rotate said basket relative to the distal end of said sheath,

the improvement wherein

said basket has a generally bulbous form adjacent its distal end, the maximum diameter of said basket being spaced from the end of said basket a distance of equal to between about one quarter and one third the overall length of said basket.

said bulbous form defined by a set of generally flat spring strips,

first portions of said generally flat spring strips closely adjacent the distal extremity of said basket lying at an angle close to the axis of said basket in a manner to facilitate collapse of said basket during withdrawal into said sheath, and second portions of said strips proximal of said first strip portions extending outwardly of the first strip portions, and having a curved shape comprised sequentially of oppositely directed arcs,

the ratio of radial to circumferential dimensions of the material of said strips of said basket being between about 1:2 and 1:4,

at least two of said strips at the distal extremity of said basket being disposed face to face and joined together in a manner contributing stiffness to said bulbous end of said basket.

**4,590,939**

## METHOD OF RELIEF OF PAIN BASED ON THE USE OF A NON-INVASIVE PRESSURE-APPLICATION DEVICE WHICH PRODUCES A HIGHLY-LOCALIZED SELF-INDUCED MASSAGE

**Carol G. Sakowski, Rte. 1, Box 50, Barneveld, Wis. 53507**

**Continuation of Ser. No. 463,297, Feb. 2, 1983, abandoned. This application Aug. 6, 1984, Ser. No. 637,744**
**Int. Cl.[4] A61B *17/34***
**U.S. Cl. 128—329 A** **6 Claims**

1. The method of applying acupressure therapy to a mammal without necessitating an attendant to manually maintain the positioning of the acupressure device at the acupressure point, said method comprising:

A. providing an acupressure apparatus comprised of a supporting base member of sufficient surface area to engage the body surface of the mammal, an acupressure projecting member which extends outwardly from said base member to provide acupressure at the acupressure point with said projecting member and said base member cooperatively providing means to limit the amount of acupressure applied to the acupressure point by said acupressure projecting member, at least one elastomeric strap of sufficient length and elasticity to permit the acupressure apparatus to encompass a portion of the body of the mammal at the acupressure point, and means for adjusting and securing said elastomeric strap about the encompassed portion of the mammal while said elastomeric strap is maintained under elastomeric tension,

B. encompassing the apparatus about the portion of the body of the mammal at the desired acupressure site,

C. applying acupressure therapy to the acupressure point by adjusting and securing the elastomeric strap to an elastomeric tension sufficient to permit the acupressure projecting member to apply acupressure therapy at the acupressure point,

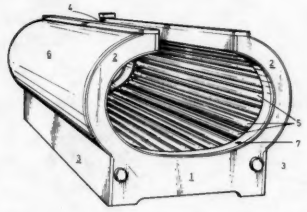
D. maintaining the acupressure upon said projecting member at the acupressure point by said apparatus, and

E. removing the acupressure apparatus from said mammal upon completion of the acupressure therapy.

## 4,590,940
## SUN BED WITH IMPROVED RADIANT PERFORMANCES

Wilhelmus A. M. Pigmans, Koeistratt, 1, Arendonk, Belgium

Filed Jun. 7, 1984, Ser. No. 618,162
Claims priority, application Belgium, Jun. 7, 1983, 2/60123
Int. Cl.[4] A61N 5/06
U.S. Cl. 128—376 3 Claims



1. A sun bed comprising:

a fixed frame defining an open-ended tunnel-shaped horizontal enclosure, generally eliptical in cross-section, having a generally horizontal major dimension;

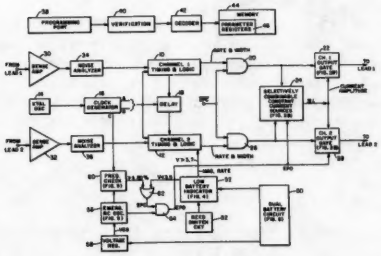
means defining a longitudinal slot in the top of said enclosure extending the entire length thereof and of a width sufficient to provide access therethrough for a user of said bed; and

rows of tanning tube lamps secured to the inner sides of said enclosure and extending lengthwise thereof.

## 4,590,941
## CARDIAC PACER WITH IMPROVED BATTERY SYSTEM, OUTPUT CIRCUITRY, AND EMERGENCY OPERATION

Stanley H. Saulson, Miami; Edward A. Schroeppel, Miramar, and Peter P. Tarjan, Miami, all of Fla., assignors to Cordis Corporation, Miami, Fla.

Division of Ser. No. 239,467, Mar. 2, 1981, Pat. No. 4,437,466.
This application Oct. 17, 1983, Ser. No. 542,515
Int. Cl.[4] A61N 1/36
U.S. Cl. 128—419 PG 10 Claims



1. An implantable tissue stimulator having at least one output channel, a plurality of parameter registers for rate and pulse intensity, stimulating logic means for producing an output signal to said output channel in accordance with the parameter values stored in said registers, wherein the improvement comprises:

said stimulating logic means including a crystal oscillator timing means and a digital circuit means for producing said pacing logic means output in accordance with said parameter registers;

means for detecting an emergency condition and for generating an emergency mode signal;

a continuously operating emergency oscillator separate from said crystal oscillator timing means and from said parameter registers for continuously producing an emergency output at a predetermined acceptable rate and predetermined pulse width both during non-emergency condition operation of said stimulator and during emergency condition operation of said stimulator;

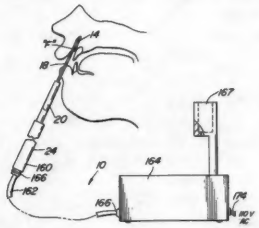
said emergency detecting means including means for checking the frequency of said crystal oscillator relative to the output of said emergency oscillator for producing an output indicative of failure of said crystal oscillator;

gating means for substituting the output of said continuously operating emergency oscillator for the output of said stimulating logic means when said emergency detecting means produces an output indicative of failure of said crystal oscillator.

## 4,590,942
## APPARATUS AND METHOD FOR INHIBITING NASAL SECRETIONS

Henry S. Brenman, Cinnaminson, N.J.; Harold L. Schwartz, King of Prussia, Pa., and Philip Katz, Princeton Junction, N.J., assignors to Biosonics, Inc., Phila., Pa.

Filed Feb. 17, 1984, Ser. No. 581,061
Int. Cl.[4] A61N 1/36
U.S. Cl. 128—419 R 14 Claims



1. A method for inhibiting nasal secretions, comprising the steps of placing in the oral cavity of the user on opposite sides of the frenulum and beneath the philtrum a pair of electrodes, and generating and applying to said electrodes a stimulating signal, wherein, said step of generating a stimulating signal is performed by generating a series of positive pulses having pulse widths of about one second, and spacing said pulses by about one second.

## 4,590,943
## SYSTEM FOR PROVIDING POWER TO PORTABLE DEFIBRILLATOR

Mike M. Paull, Seattle; Jerry D. Smith, Everett, and Kathleen D. Schoenberg, Carnation, all of Wash., assignors to Physio-Control Corporation, Redmond, Wash.

Filed Apr. 19, 1985, Ser. No. 725,220
Int. Cl.[4] A61N 1/36
U.S. Cl. 128—419 D 7 Claims

1. A system for providing battery power to a portable defibrillator that comprises a first housing having a generally vertical first sidewall, the system comprising:

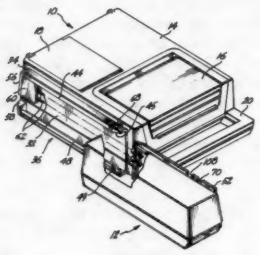
(a) a battery pack including a second housing having a second sidewall, battery means mounted within the second housing, and first electrical connector means mounted in and extending through the second housing and electrically connected to the battery means;

(b) upper groove means extending along the upper edge of the first sidewall and forming a downwardly facing horizontal groove;

(c) lower groove means extending along the lower edge of

the first sidewall and forming an upwardly facing horizontal groove;

(d) tongue means extending from the second sidewall and shaped to be slidingly received between the upper and lower groove means to mount the battery pack to the defibrillator;



(e) latch means for latching the tongue means against lengthwise motion when the tongue means is received between the upper and lower groove means;

(f) second electrical connector means extending from the first sidewall between the upper and lower groove means and adapted to engage the first electrical connector means when the battery pack is mounted to the defibrillator.

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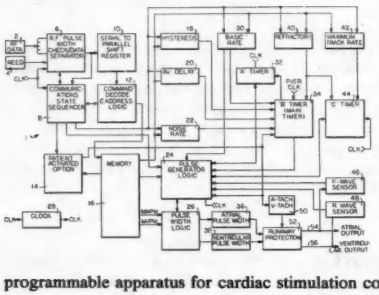
**4,590,944**

## CARDIAC TISSUE STIMULATOR FOR STIMULATING IN THE DDX MODALITY

**Brian M. Mann, 12079 Beaufait, Northridge, Calif. 91326, and Joseph J. Florio, 10805 Wicks St., Sunland, Calif. 91040**

**Filed Jan. 27, 1984, Ser. No. 574,708**
**Int. Cl.[4] A61N *1/36***
**U.S. Cl. 128—419 PG** **7 Claims**



1. A programmable apparatus for cardiac stimulation comprising:

a first sensing means for sensing electrical activity in a first area of tissue;

a second sensing means for sensing electrical activity in a second area of tissue;

a pulse generating timing means connected to said first and second sensing means response to electrical activity sensed in said first and second area of tissue respectively for defining a stimulation cycle and for determining the timing for supplying electrical pulses within said stimulation cycle to said first and second areas of tissue for respective depolarization of said first and second areas of tissue;

pulse generating means responsive to said pulse generating timing means for generating stimulating pulses that are selectively delivered to said first and second areas of tissue; and

circuit means for inhibiting the operation of said first sensing means for the duration of the stimulation cycle whenever premature electrical activity is sensed in said second area of tissue by said second sensing means prior to one of a set of prescribed events, said set of prescribed events comprising: (1) the sensing of electrical activity by said first sensing means in said first area of tissue during said stimulation cycle, and (2) the generating of a stimulation pulse by said pulse generating means for delivery to said first area of tissue during said stimulation cycle.

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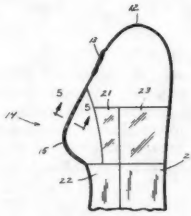
**4,590,945**

## GARMENT

**Christine J. K. Fiel, 6046 Carriage Hill Dr., East Lansing, Mich. 48823**

**Filed Jan. 28, 1985, Ser. No. 695,841**
**Int. Cl.[4] A41B *9/00*; A41C *3/08***
**U.S. Cl. 128—455** **4 Claims**



3. In an integrally formed garment for female wear which is adapted to lend gentle shaping to the figure of a woman but which eliminates the need for a brassiere, the improvement comprising:

a resilient integrally formed seamless polyester fiberfill bust cup assembly, said bust cup assembly defining a pair of spaced apart integrally formed breast-receiving cups therein;

a side panel attached to the end of said bust cup assembly, said side panels being cut on a bias so as to take advantage of the natural stretch of the fabric;

a front skirt panel attached at its upper edge to the lower horizontal edge of said bust cup assembly; and

an elongate back garment panel attached at the upper portions of its longitudinal vertically-oriented edges to each of said side panels and at the lower portions of its longitudinal vertically-oriented edges to the corresponding longitudinal edges of said front skirt panel so as to complete the encirclement of the body of the wearer, said elongate back garment panel being cut on a bias so as to take advantage of the natural stretch of the fabric.

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**4,590,946**

## SURGICALLY IMPLANTABLE ELECTRODE FOR NERVE BUNDLES

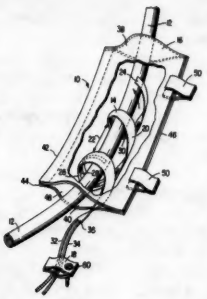
**Gerald E. Loeb, Clarksburg, Md., assignor to Biomed Concepts, Inc., Clarksburg, Md.**

**Filed Jun. 14, 1984, Ser. No. 620,640**
**Int. Cl.[4] A61B *5/04*; A61N *1/05***
**U.S. Cl. 128—642** **13 Claims**

1. A surgically implantable electrode system for providing electrical connection to a nerve bundle, said system comprising:

(a) electrode means having a helically-shaped carrier member of insulative material adapted to be positioned around said nerve bundle, said electrode means having at least two contact elements on said carrier member for engagement with said nerve bundle and an electrical lead-in

conductor member connected to each of said contact elements, and



(b) membrane means for enclosing said electrode means to confine electrical currents passing through said electrode means to said nerve bundle.

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**4,590,947**

## HIGH-FREQUENCY DEVICE CONTAINING A SURFACE COIL FOR NUCLEAR SPIN RESONANCE APPARATUS

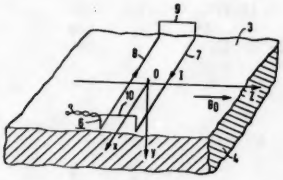
**Norbert Krause, Heroldsbach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Oct. 26, 1984, Ser. No. 665,355**

**Claims priority, application Fed. Rep. of Germany, Nov. 8, 1983, 3340337**

**Int. Cl.[4] A61B 5/05**

**U.S. Cl. 128—653** **6 Claims**



1. Apparatus for at least one of generating a magnetic high-frequency field and receiving corresponding high-frequency signals in nuclear spin resonance apparatus having means for receiving a body to be examined and comprising surface coil winding means arranged within at least a partially homogeneous magnetic field region of a magnetic field generated by a base field magnet, said magnetic field having an orientation direction, the body being introduceable into said means for receiving along an axis parallel to said orientation direction, said surface coil winding means adapted to be disposed either directly on only one side of a surface of the body to be examined or at least in the vicinity of only said one side of the surface of the body and generating an inhomogeneous magnetic field in said body, said surface coil winding means having a substantially rectangular shape and having at least two parallel-extending longitudinal conductor sections and at least two transverse conductor sections, said transverse conductor sections coupling pairs of said longitudinal conductor sections, said longitudinal conductor sections being substantially longer than said transverse conductor sections, said longitudinal conductor sections being arranged substantially perpendicular to the orientation direction of the magnetic field of the base field magnet.

**4,590,948**

## METHOD AND APPARATUS FOR MEASURING THE BLOOD FLOW IN THE SUPERFICIAL BLOOD VESSELS OF TISSUE

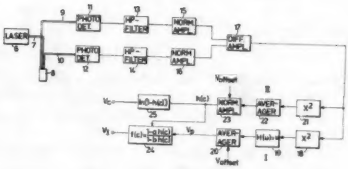
**Gert Nilsson, Lund, Sweden, assignor to Perimed KB, Stockholm, Sweden**

**Filed Jan. 7, 1985, Ser. No. 689,489**

**Claims priority, application Sweden, Jan. 20, 1984, 8400289**

**Int. Cl.[4] A61B 5/02**

**U.S. Cl. 128—666** **13 Claims**



8. An apparatus for determining the blood flow in the superficial blood vessels of tissue, comprising

a monochromatic light source;

means for irradiating a section of the tissue surface with light from said light source;

means for collecting light scattered by moving blood cells and adjacent stationary structures within a part of said irradiated section;

a photo-detector arrangement for receiving said collected, scattered light and producing a corresponding electric output signal; and

a signal processor including high-pass filter circuits to which the output signal of said photo-detector arrangement is applied for removing d.c. signal components therefrom,

first circuit means receiving the output signal of said high-pass filter circuits for producing a first signal representing the mean time value of the expression

$$\int_{\omega_1}^{\omega_2} \omega P(\omega)\, d\omega$$

where $\omega$ is the frequency of said output signal, $P(\omega)$ is the power of said output signal as a function of its frequency, and $\omega_1$ and $\omega_2$ are limit frequencies of a frequency band within which at least a major part of said output signal lies,

second circuit means receiving the output signal of said high-pass filter circuits for producing a second signal proportional to the mean time value of the expression

$$\int_{\omega_3}^{\omega_4} \omega P(\omega)\, d\omega$$

where $\omega_3$ and $\omega_4$ are limit frequencies of a frequency band within which at least a major part of said output signal lies, and

a controllable amplifying circuit having a signal input to which said first signal is applied, a control input to which said second signal is applied, and an amplifying factor controlled by and dependent on said second signal,

the output signal of said amplifying circuit constituting a measurement of the blood flow.

4,590,949

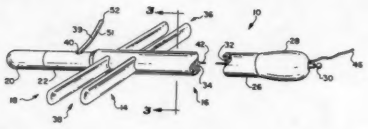
## NEURAL STIMULATING LEAD WITH STABILIZING MECHANISM AND METHOD FOR USING SAME

Peter J. Pohndorf, Miami Shores, Fla., assignor to Cordis Corporation, Miami, Fla.

Filed Nov. 1, 1984, Ser. No. 667,228

Int. Cl.[4] A61N 1/04

U.S. Cl. 128—785 20 Claims



1. A neural stimulating lead comprising a hollow lead body having a proximal end and a distal end portion which has a side port therein, a distal electrode assembly mounted in said distal end portion and including

a sleeve electrode, a stimulator connector mounted at said proximal end of said lead body, a wire conductor connected between said sleeve electrode and said stimulator connector and an active fixation stabilizing mechanism situated in said distal end portion and comprising stiff, but flexible, laterally projecting, vertebrum engaging means and

extendable/retractable, dorsal stabilizing means comprising a stiff, but flexible, elongate member which has a proximal inner end and a distal, free end and which is movable transversely of said vertebrum engaging means through said port between a retracted position and an extended position where said free end bears against a dorsal wall of a vertebrum for anchoring said lead within an epidural space of a vertebrum of a spine, said elongate member being positioned entirely within the hollow lead body in its retracted state, and being extendible outwardly from its position within the hollow lead body through said port.

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4,590,950

## ELECTRICAL CONNECTION

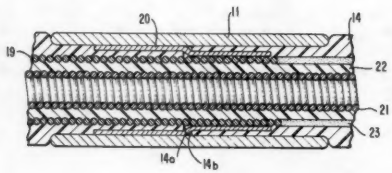
Jerzy G. Iwaszkiewicz, North Ryde, and Janusz Kuxma, Stanmore, both of Australia, assignors to Telectronics Pty, Limited, Lane Cove, Australia

Filed Dec. 8, 1983, Ser. No. 559,239

Claims priority, application Australia, Dec. 20, 1982, 91666/82

Int. Cl.[4] A61N 1/05

U.S. Cl. 128—786 14 Claims



1. An electrical connection assembly comprising:

a first conductor;

compressible tubular insulating means surrounding said first conductor;

a conductive bridge, one end of which is in electrical contact with said first conductor and the other end of which projects through an aperture in said insulating means; and

a second tubular conductor engaged around a predetermined length of said insulating means, the inner diameter of said second conductor being smaller than the outer diameter of said insulating means so that there is a compression fit between said first and second conductors and said compressible insulating means with said insulating means being compressed between said first and second conductors, said one end of said first conductive bridge being clamped between said first conductor and said insulating means, and said other end of said conductive bridge being clamped between said insulating means and said second conductor for providing electrical continuity between said first conductor and said second conductor.

11. A body-implantable lead comprising:

an elongated conductor;

a compressible, cylindrical tubular insulating sheath covering said elongated conductor;

a bridging conductor electrical coupled to said elongated conductor and passing through an aperture in said insulating sheath; and

an outer cylindrical, tubular electrode positioned over said sheath in a compression fit with said insulating sheath being compresssed between said elongated conductor and said tubular electrode, said bridging conductor being coupled to said elongated conductor by being compressed between said elongated conductor and said insulating sheath, the portion of said bridging conductor passing through the aperture being clamped between said sheath and said electrode to provide electrical continuity between said elongated conductor and said electrode, the outer diameter of said electrode and said sheath being substantially similar so that there is no discontinuity in the external shape of the lead proximate said electrode.

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4,590,951

## BREATHING APPARATUS

Richard K. O'Connor, London, England, assignor to Racal Safety Limited, Wembley, England

Filed Jun. 6, 1984, Ser. No. 617,910

Claims priority, application United Kingdom, Jun. 7, 1983, 8315589; Nov. 11, 1983, 8330142

Int. Cl.[4] A62B 7/10

U.S. Cl. 128—204.23 15 Claims

1. A power assisted respirator comprising a facepiece defining a space for covering the mouth and nose of the wearer and having an inlet and an outlet for air, one-way exhale valve means in said outlet which is operable to permit air to flow out of said space within said facepiece when a predetermined differential pressure is established thereacross, non-positive displacement pump means having inlet means for air and an outlet, said pump means permitting, in its inoperative state, flow of gas between said inlet means and said outlet, battery means connected to said pump means for energizing said pump means, said outlet being connected to the inlet of said facepiece for supplying air thereto, one-way inlet valve means between said pump outlet and said space, said one-way inlet valve

means permitting air to flow from said pump outlet to said space through said inlet of said facepiece but not in the reverse direction when the pressue in said space exceeds the pressure at the outlet of said pump means, the operating parameters of said pump means and said exhale valve means being selected so that, during exhalation by the wearer, the inlet valve means will close and the pump means will be placed in a condition in which it will substantially cease to operate effectively, filter means connected to said inlet means of said pump means for filtering air supplied thereto, pressure sensor means connected between said pump means and said filter means for sensing the pressure of air passing between said pump means and said filter means, and control means responsive to said pressure sensor means for causing disconnection of said pump means from said battery means when the pressure sensed by said pressure sensor means rises above a preset level.

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**4,590,952**

**AUTOMATIC CONTROL DEVICE FOR ADJUSTING THE SUCTION EXERTED BY SUCTION FLUTES IN CIGARETTE TRANSFER DRUMS**

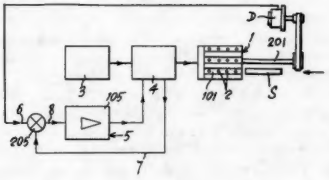
**Alfonso Manfredini, S. Lazzaro di Savena, Italy, assignor to Sasib S.p.A., Bologna, Italy**

**Filed Aug. 13, 1981, Ser. No. 292,398**

**Claims priority, application Italy, Aug. 29, 1980, 12636 A/80**

**Int. Cl.⁴ A24C** *5/35, 5/47, 5/00*

**U.S. Cl. 131—94** **9 Claims**




1. An automatic control device for a rotary longitudinally fluted suction drum having flutes with a plurality of suction ports communicating with a vacuum source, rod-like articles from a cigarette-making machine being introduced lengthwise into said flutes and being braked and retained in said flutes due to the suction exerted through said suction ports, comprising: an adjustable control device operatively inserted between said suction ports and said vacuum source; and control means connected to said adjustable control device for automatically adjusting the suction exerted by the flutes substantially proportionally to the speed of production of the cigarette-making machine.

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**4,590,953**

**ALKYL α-CAMPHOLENATES AND DIHYDRO DERIVATIVES THEREOF AS TOBACCO FLAVORANTS**

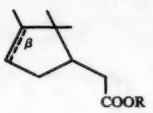
**Martin Rohr, Glen Rock, and Cormack Flynn, Ramsey, both of N.J., assignors to Givaudan Corporation, Clifton, N.J.**

**Division of Ser. No. 461,079, Jan. 26, 1983, Pat. No. 4,547,315. This application Apr. 12, 1985, Ser. No. 722,903**

**Int. Cl.⁴ A24B** *15/30*

**U.S. Cl. 131—276** **2 Claims**

1. A tobacco product comprising an effective amount of a compound of the formula




I

wherein:

R represents methyl, ethyl, propyl or butyl, and the dotted line designated by β is an optional bond.

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**4,590,954**

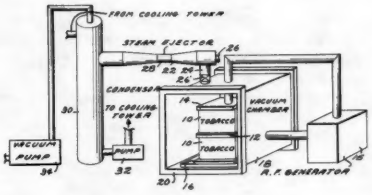
**PROCESS FOR PACKAGING LEAF TOBACCO**

**Eldon D. Gooden, 9916 Oldfield Dr., Richmond, Va. 23235**

**Filed Sep. 11, 1984, Ser. No. 649,478**

**Int. Cl.⁴ A24B** *15/22*

**U.S. Cl. 131—299** **12 Claims**




1. A method of treating leaf tobacco for storage comprising the steps of:

(a) tightly packing the leaves in a container that is non-conductive and with the leaves having a relatively high moisture content;

(b) subjecting the packed leaves to a heat treatment by exposing the packed container to an electromagnetic field to heat the leaves to a temperature of approximately 180° F. to thereby drive off a portion of the moisture in the leaves;

(c) subsequently, subjecting the packed leaves to a high vacuum to further reduce the moisture content thereof and to reduce the temperature of the leaves, and

(d) the method further including the step of removing the stems from the tobacco leaves prior to packing the leaves in the container.

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**4,590,955**

**CIGARETTE PAPER WITH REDUCED CO ON BURNING**

**Ajit S. Dixit, Brevard, N.C., assignor to Olin Corporation, Pisgah Forest, N.C.**

**Filed Jul. 11, 1984, Ser. No. 629,804**

**Int. Cl.⁴ A24B** *15/18;* **A24D** *1/02*

**U.S. Cl. 131—365** **15 Claims**

1. Smoking article wrapper comprising a cellulosic sheet containing an amount of a non-ionic surfactant sufficient to reduce the amount of carbon monoxide produced upon burning said cellulosic sheet.

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**4,590,956**

**BED TENT**

**Harrell Griesenbeck, P.O. Box 665, Ennis, Tex. 75119**

**Filed Apr. 27, 1984, Ser. No. 604,847**

**Int. Cl.⁴ A45F** *1/00*

**U.S. Cl. 135—116** **18 Claims**

1. A bed tent for providing an enclosure over a conventional mattress comprising:

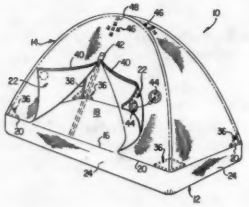
base means adapted to be removably fitted partially around the mattress and having a surface area sufficient to cover at least one major surface of the mattress,

retention means on said base means for engaging only a

portion of the underside of the mattress for retaining said base means on the mattress;

canopy means for defining an enclosure above said base means that is coextensive with the upper major surface of the mattress;

means for connecting said base means to said canopy means;



flexible frame members for supporting said canopy means over said base means, said frame members engaging the upper surface of said base means and held in position by said canopy means; and

said canopy means further comprising means for providing ingress and egress to the user.

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**4,590,957**

**PRESSURE RELIEF DEVICE**

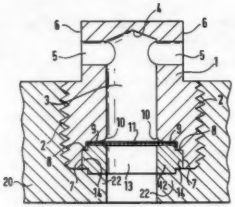
**Glenton P. McFarlane, Harlow, England, assignor to Johnson Matthey Public Limited Company, London, England**

**Filed Oct. 26, 1983, Ser. No. 545,769**

**Claims priority, application United Kingdom, Oct. 28, 1982, 8230818**

**Int. Cl.⁴ F16K *17/14***

**U.S. Cl. 137—68.1** **1 Claim**



1. A torque-free bursting disc assembly, comprising:

a housing having a seat;

a metal tubular body having an outer threaded surface for engaging said housing, a central bore extending through a first end of said body, and a counterbore at said first end with a rounded step between said central bore and said counterbore, said counterbore forming an annular seat;

a flat bursting disc mounted on said annular seat;

a metal plug fitting in said counterbore to hold said disc on said annular seat, said plug having a longitudinal bore and an exterior surface with a plurality of knurls thereon extending parallel to said longitudinal bore, said knurls engaging said counterbore to provide an interference fit between said plug and said tubular body so that said plug cannot rotate with respect to said tubular body, said plug having first and second ends with knurl-free exterior surfaces so that said plug is reversible, said first and second plug ends having an extending portion which extends beyond said tubular body first end when said plug is inserted in said body, said extending portion forming a fluid-tight seal with said housing seat when said tubular body is inserted in said housing.

**4,590,958**

**TWO-POSITION SWITCHING VALVE HAVING HYDRAULIC SELF-HOLDING PROPERTIES**

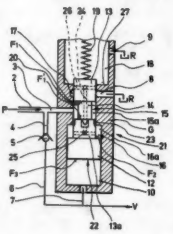
**Rudolf Brunner, Baldham, Fed. Rep. of Germany, assignor to Heilmeier & Weinlein Fabrik fur Oel-Hydraulik GmbH & Co. KG, Munich, Fed. Rep. of Germany**

**Filed Sep. 10, 1985, Ser. No. 774,567**

**Claims priority, application Fed. Rep. of Germany, Sep. 12, 1984, 3433535**

**Int. Cl.⁴ F16K *17/04***

**U.S. Cl. 137—115** **7 Claims**



1. A two-position switching valve having hydraulic self-holding properties, comprising a housing bore forming part of a flow path from a pressure inlet to a radial pressure outlet, a closure piston mounted for reciprocating displacement between a closure position and a relief position in a reduced-diameter portion of said housing bore, a control piston disposed in an enlarged-diameter portion of said housing bore and connected to said closure piston by a piston shaft carrying a piston portion having the diameter of said closure piston, said closure piston cooperating with said piston portion to define an annular space in said reduced-diameter bore portion, said control piston having its end facing away from said closure piston acted on by a control pressure varying between a maximum and a minimum limit, and its other, smaller end, by the pressure prevailing in said pressure inlet, and a spring disposed in a pressure-relieved chamber at the side of the closure piston facing away from said control piston to bias said closure piston in the direction of said closure position in opposition to the control pressure acting on said control piston, characterized in that said pressure inlet (3) opens into said annular space (15), that said piston portion (13*a*) is disposed adjacent said control piston (12) and cooperates therewith to define an annular chamber (16*a*) in the larger-diameter housing bore portion (16), and in that between said annular space (15*a*) and said annular chamber (16*a*) and between said annular chamber (16*a*) and said pressure-relieved chamber (18) or said pressure outlet (8), respectively, there are provided exclusively alternately openable and closable flow connections (23;24), one said flow connection (23) connecting said annular space (15*a*) to said annular chamber (16*a*) when said closure piston is in its closure position, while another flow connection (24) connects said annular chamber (16*a*) to said pressure relieved chamber (18) when said closure piston (13) is in its relief position.

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**4,590,959**

**VALVES**

**Edward S. Fort, Clitheroe, England, assignor to Fort Vale Engineering Limited, Nelson, England**

**Filed Mar. 22, 1983, Ser. No. 477,750**

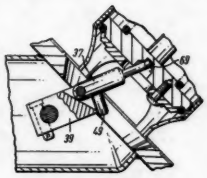
**Claims priority, application United Kingdom, Mar. 23, 1982, 8208457**

**Int. Cl.⁴ F16K *51/00*; F16G *1/00***

**U.S. Cl. 137—315** **3 Claims**

1. A valve assembly comprising a movable valve member, a valve seat towards which the movable valve member is urged resiliently, a valve operating mechanism comprising a connecting rod, a pocket in the movable valve member defined by a

blind recess in the valve member, and a closure plate extending across the open end of the blind recess, said closure plate defining a throughgoing elongated recess, said pocket having a groove in the closed end thereof which is dimensioned to receive one end of the connecting rod to resist rotation of the movable valve member, said groove being disposed at 90° C. to



said elongated recess in the closure plate, said one end of the connecting rod being engagable releasably within the pocket by relative rotation between the connecting rod and the movable valve member, the connecting rod co-operating with the movable valve member to displace the movable valve member at least in a direction to open the valve.

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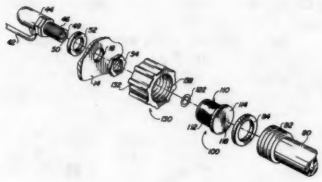
**4,590,960**

## HOSE CONNECTOR ADAPTER APPARATUS FOR EVAPORATIVE COOLER FLOAT VALVE

**Robert L. Koble, Jr., 521 W. Lynwood, Phoenix, Ariz. 85003**

**Filed Jan. 7, 1985, Ser. No. 689,317**
**Int. Cl.[4] F16K** *43/00, 31/18, 33/00*
**U.S. Cl. 137—315** **4 Claims**



1. Connector apparatus for connecting a garden hose to a float valve, comprising, in combination:

hose connector means rotatable for connecting to the garden hose, including

a first bore internally threaded for connecting to the garden hose and having a first end for receiving the garden hose and a second end remote from the first end,

a first flange extending radially inwardly at the second end of the first bore,

an opening extending through the radially inwardly extending flange, and

a shoulder between the opening and the first bore; and

valve connector means rotatable relative to the hose connector means for connecting to the float valve, including

a first portion extending through the opening in the hose connector means,

a second bore in the first portion internally threaded for connecting to the float valve,

a third bore communicating with the second bore through which water flows from the hose to the float valve,

a second flange defining a second portion extending radially outwardly from the first portion remote from the second bore and disposed against the first flange of the hose connector means, and

a tapered portion comprising a ferrule at the juncture of the second bore and the third bore, said tapered portion extends into the second bore and is concentric therewith in a first abutting sealing engagement with the float valve.

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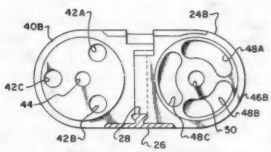
**4,590,961**

## MODULAR ROLLING CONDUCTOR SUPPORT

**Peter R. Schumann, Milwaukee, Wis., assignor to Cooper Industries, Inc., Houston, Tex.**

**Filed Aug. 16, 1985, Ser. No. 766,603**
**Int. Cl.[4] B65H** *75/36*
**U.S. Cl. 137—355.16** **13 Claims**



1. A modular rolling conductor support comprising:

a plurality of pivotally connected conductor carriers which are connectable between a stationary energy supply and a moving energy consumer wherein each conductor carrier includes; a body having a generally planar body bottom and two body sidewalls with an integral body reinforcing rib extending at least along said body bottom, each body sidewall defining a plurality of locating orifices surrounding a first pivot point at a first end of the sidewall and a plurality of arcuate slots surrounding a second pivot point at a second end of the sidewall;

removable retaining means releasably maintaining the supported conductors within said rolling conductor support; and

a cap for releasably securing the first end of a body sidewall to the second end of a body sidewall in a successive conductor carrier, and for delimiting the range of pivotal movement between successive conductor carriers by means of integral stop projections which interfit within the arcuate slots.

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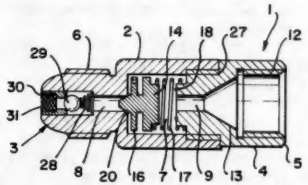
**4,590,962**

## GAS FUSE

**Brian Tespa, 699 Wade Avenue W., Penticton, B.C. V2A 1V6, Canada**

**Continuation-in-part of Ser. No. 407,828, Aug. 13, 1982, abandoned. This application Jun. 6, 1984, Ser. No. 617,687**
**Claims priority, application Canada, Jul. 7, 1983, 406833**
**Int. Cl.[4] F16K** *31/12*
**U.S. Cl. 137—498** **9 Claims**



1. A gas safety valve, comprising:

(a) a housing including an inlet end and an outlet end and said housing having a longitudinally extending generally cylindrical chamber therein;

(b) said inlet and adapted for connection to a source of pressurized gas and having an inlet opening communicating with said chamber for permitting gas flow thereto;

(c) said outlet end adapted for connection to a gas distributor and having an outlet opening communicating with said chamber for permitting gas flow therefrom;
(d) valve means disposed in said chamber and adapted for longitudinal displacement between said inlet opening and said outlet opening in response to the gas pressure differential between said openings;
(e) said valve means including first and second annular parallel disks each having top and bottom surfaces;
(f) a centrally disposed axial shaft positioned between and separating said parallel disks and having a diameter substantially less than the diameter of either of said disks;
(g) said axial shaft and said disks forming therebetween an annular recess;
(h) said disks having an outer diameter substantially equal to the diameter of said chamber for providing sliding sealing engagement with the wall of said chamber;
(i) said first disk including means for sealing said inlet opening and thereby preventing gas flow to said chamber when the pressure differential between said openings is less than a first preselected level so that said valve means is displaced to and seals said inlet opening;
(j) said second disk including means for sealing said outlet opening and thereby preventing gas flow from said chamber when the pressure differential between said openings exceed a second preselected level and thereby causes said valve means to be displaced to and seal said outlet opening;
(k) resilient means engaged with said valve means and with said outlet end for biasing said valve means for longitudinal displacement toward said inlet and so that the pressure differential between said opening must exceed the first preselected level to cause said valve means to be displaced out of sealing engagement with said inlet opening and to thereby permit gas flow to said chamber;
(l) at least a first passageway in said first disk axially extending from said top surface to said bottom surface and opening into said annular recess for permitting gas flow from said inlet opening to said annular recess when said valve means is displaced away from said inlet end;
(m) at least a first passageway in said second disk axially extending from said top surface to said bottom surface and opening into said chamber permitting gas flow from said annular recess into said chamber when said valve means is displaced away from said outlet end; and,
(n) said first disk passageway and said second disk passageway being displaced axially from each other at least 90° to permit a shift of fluid laterally in said annular recess as it passes from the first disk passageway to the second disk passageway.

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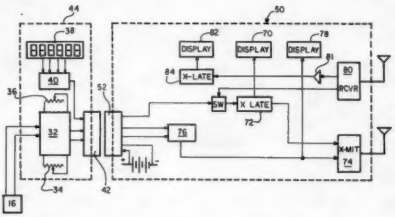
**4,590,963**

## METHOD OF AND APPARATUS FOR DETERMINING THE POSITION OF A MOVABLE MEMBER

**William N. Gardner, Enfield, and Kenneth R. Rohde, Granby, both of Conn., assignors to Combustion Engineering Co., Inc., Windsor, Conn.**

**Filed Apr. 3, 1985, Ser. No. 719,893**
**Int. Cl.[4] F16K *37/00***
**U.S. Cl. 137—554** **18 Claims**

1. A method of determining whether a movable member is correctly positioned from a location remote from the member comprising the steps of:
recording the identity of and a desired position of the movable member at the remote location;
coupling a position sensor to the movable member;
connecting a passive position signal generator to the position sensor;
configuring a movable member identification signal generator associated with and located in the vicinity of the movable member so that it may produce an encoded signal which uniquely identifies the movable member;
supplying power to the passive position signal generator and the movable member identification signal generator whereby the position signal generator will produce an information bearing signal commensurate with movable member actual position and the movable member identification signal generator will produce an information bearing signal commensurate with the identity of the movable member;
transmitting the position and identity information contained in the signals produced by the position signal generator




and the movable member identification signal generator when power is supplied thereto to a remote location;
receiving the transmitted information at the remote location;
employing the transmitted identity information to determine the desired position of the movable member from the recorded information; and
comparing the signals commensurate with the actual and desired positions of the movable member to ascertain if a position error exists.

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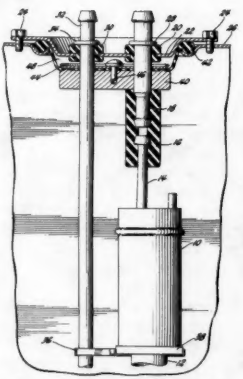
**4,590,964**

## NOISE ISOLATION FOR A FUEL SYSTEM

**John M. Beardmore, Howell, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Apr. 26, 1985, Ser. No. 727,596**
**Int. Cl.[4] E03B *11/16;* F04B *11/00***
**U.S. Cl. 137—565** **2 Claims**



1. An improvement in noise isolators for fuel systems having a fuel tank, an electric motor driven fuel pump disposed within the tank, fuel discharge passage means and return passage means for directing fuel from and to the fuel tank respectively wherein the improvement comprises; a cover plate for closing an opening in said fuel tank; elastomeric grommet means sealingly engaging cover plate and sealingly engaging said discharge passage means and said return passage means for isolating said passage means from said cover plate and said fuel tank; flared portion means on each of said passage means abutting

the said grommet means for limiting movement of said passage means relative to said grommet toward the interior of the fuel tank; and reaction mass means secured to both of said passage means for providing a mechanical impedance for absorbing vibratory energy from the fuel pump.

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**4,590,965**

## PRESSURE AGENT CONTROL ARRANGEMENT FOR AUXILIARY POWER STEERING MECHANISMS

**Armin Lang, Schwabisch Gmund, and Helmut Knödler, Lorch, both of Fed. Rep. of Germany, assignors to Zahnradfabrik Friedrichshafen, AG., Friedrichshafen, Fed. Rep. of Germany**

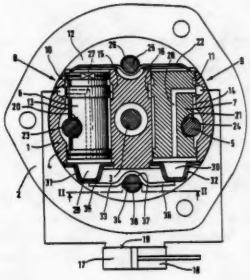
**PCT No. PCT/EP84/00133, § 371 Date Mar. 15, 1985, § 102(e) Date Mar. 15, 1985, PCT Pub. No. WO85/00565, PCT Pub. Date Feb. 14, 1985**

**PCT Filed May 4, 1984, Ser. No. 713,406**

**Claims priority, application Luxembourg, Jul. 23, 1983, PCT-EP83/00196**

**Int. Cl.[4] F15B *9/08***

**U.S. Cl. 137—596** **7 Claims**



1. In a booster steering control valve of this kind having valve pistons axially shiftable in a valve body (1) and having reaction chambers at corresponding ends with respective closure gaps (31, 32) engaging the valve body including securing means for securing said closure caps to said valve body;

the improvement wherein said securing means comprises a resilient clamp (33) exerting force against said closure caps; said resilient clamp having ends (35, 36) which bear resiliently on said closure caps for securing said closure caps against said valve body; and a pin (34) engaging said resilient clamp to force resilient engagement of the ends thereof against said enclosure caps; bore means (40) in said valve body and said pin being carried in said bore means.

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**4,590,966**

## CONTROL-VALVE SYSTEM AND BLOCK FOR A FLUID-OPERATED CYLINDER-AND-PISTON ASSEMBLY

**David S. Figueroa, and Jorge A. P. Heredia, both of Monterrey, Mexico, assignors to Vitro Tec Fideicomiso, Monterrey, Mexico**

**Filed Apr. 27, 1984, Ser. No. 604,505**

**Claims priority, application Mexico, Apr. 28, 1983, 197100**

**Int. Cl.[4] F15B *13/044***

**U.S. Cl. 137—596.17** **2 Claims**

1. A digital control valve assembly for controlling the movement of a piston within a working chamber, including:

a monolithic valve body incorporating each of:

a first digital valve assembly having an inlet and an outlet, and a second digital valve assembly having an inlet and an outlet;

first and second by-pass valves;

each of said digital valves and said by-pass valves being incorporated into said valve body, said valve body providing first, second, third and fourth internal ducts;

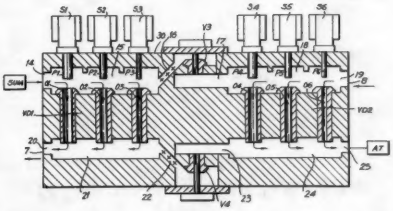
said first and third ducts respectively constituting a fluid inlet and a fluid outlet of said first digital valve;

said second and fourth ducts respectively constituting a fluid inlet and a fluid outlet of said second digital valve;

said first by-pass valve including a passage interconnecting said first and second ducts;

said second by-pass valve including a passage interconnecting said third and fourth ducts;

means for independently actuating each of said first and second digital valves and said first and second by-pass valves between an open and a closed position;



means for connecting said first duct to a supply of fluid under pressure;

means for connecting said second duct and third duct to said working chamber respectively on opposite sides of said piston;

and means for connecting said fourth duct to atmosphere;

whereby a supply of fluid under pressure connected to said first duct is operative to move said piston in one of a controlled and uncontrolled manner in one direction on opening of said by-pass valves, and is operative to move said piston in one of a controlled and uncontrolled manner in an opposite direction on closing of said by-pass valves.

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**4,590,967**

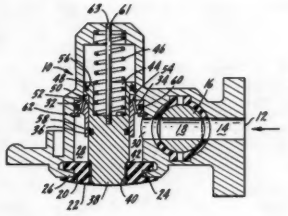
## GLADHAND WITH BUILT-IN DIRT PROTECTION PLUG

**Eugene W. Schmitt, Lockport, and Michael R. Stoltenberg, Des Plaines, both of Ill., assignors to Sloan Valve Company, Franklin Park, Ill.**

**Continuation of Ser. No. 468,155, Feb. 22, 1983, abandoned. This application Aug. 19, 1985, Ser. No. 767,041**

**Int. Cl.[4] F16K *37/00***

**U.S. Cl. 137—613** **1 Claim**



1. A gladhand and automatically-opening dirt protection plug including a gladhand body, a chamber within said body, an air outlet port in communication with said chamber, a seal positioned in said air outlet port, an elongated cylindrical dirt protection plug movable in said chamber toward and away from said seal to open and close said outlet port, said plug having a nose at one end thereof which penetrates said seal in an outlet port closing position, a spring positioned within said chamber and coaxial with said plug for urging said plug

toward a closing position with said outlet port seal, an air inlet port in said body, a shutoff valve positioned within said body between said inlet port and said chamber, said plug having a peripherally extending surface closely adjacent the other end of said cylindrical plug and communicable with said air inlet, a collar within said chamber having a cylindrical extension for mounting said plug for reciprocal movement, a space between said peripherally extending plug surface and said collar, air passage means in said collar connecting said space and said plug surface with said shutoff valve, said air inlet being connected to said passage means and to said plug surface when said shutoff valve is open to provide air pressure at said surface to cause said plug to move against said spring and away from said seal to an open position.

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**4,590,968**

## PILOT VALVE OPERATED PRESSURE REDUCING VALVE

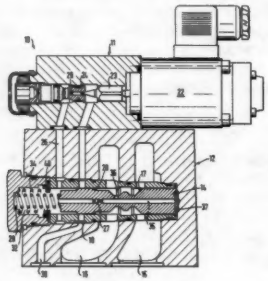
**Hans Wölfges, Lohr, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Fed. Rep. of Germany**

**Filed Jun. 18, 1984, Ser. No. 622,092**

**Claims priority, application Fed. Rep. of Germany, Jun. 29, 1983, 3323363**

**Int. Cl.[4] F15B *13/043***

**U.S. Cl. 137—625.64** **13 Claims**



1. A pressure reducing valve for controlling the communication between a high pressure port, a load port and a reservoir port each formed by a valve housing, a main piston slidable within said valve housing between a first position, a second position and a third position, said valve housing and said main piston having cooperating metering means for providing substantially unrestricted flow communication between said high pressure port and said load port and no communication between said load port and said reservoir port when said main piston is in said first position, no communication between said high pressure port and said load port and restricted communication between said load port and said reservoir port when said main piston is in said second position and less restricted communication between said reservoir port and said load port and no communication between said load port and said high pressure port when said main piston is in said third position, means for applying a control pressure to said main piston for controlling the position of said main piston, and biasing means for urging said main piston from said third position only to said second position for effecting a rapid initial decrease in pressure at said load port until said main piston is in its second position and thereafter a less rapid decrease in pressure.

**4,590,969**

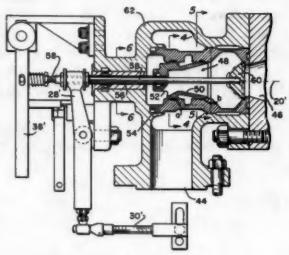
## VALVE

**Herbert J. Sirois, Niantic, and Kenneth A. Wheeler, N. Granby, both of Conn., assignors to Terry Corporation of Connecticut, Windsor, Conn.**

**Filed Mar. 28, 1985, Ser. No. 717,052**

**Int. Cl.[4] F16K *11/20, 31/44***

**U.S. Cl. 137—637.2** **1 Claim**



1. In a steam turbine, a valving arrangement, comprising:

a valve housing;

means defining a valve seat within said housing;

said seat having an aperture formed therein for accommodating steam flow therethrough;

a trip valve valving element, movable toward and away from said seat for occluding and opening said aperture to such steam flow;

a rod-actuator, coupled to said element, and movable along an axis, for moving said element toward and away from said seat; and

means supporting said rod-actuator for movement along said axis; wherein

said supporting means is translatable along said axis and its movement is limited by said trip valve rod-actuator;

said supporting means comprises another rod-actuator that supportingly receives said trip valve rod-actuator therein and coupled to a governor valve valving element movable toward and away from another apertured valve seat within said housing, for controlling steam flow through said another valve seat.

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**4,590,970**

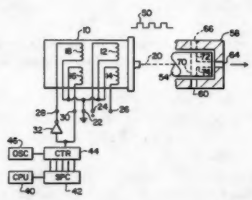
## PULSE WIDTH MODULATED PRESSURE SOURCE

**Richard C. Mott, Harwood Heights, Ill., assignor to Honeywell Inc., Minneapolis, Minn.**

**Continuation-in-part of Ser. No. 534,896, Sep. 22, 1983, abandoned. This application Jun. 26, 1985, Ser. No. 749,114**

**Int. Cl.[4] F15C *1/04***

**U.S. Cl. 137—828** **10 Claims**




1. A pressure source of a desired magnitude dependent upon the respective durations of pulse width modulated binary input signals comprising:

pressure source means of predetermined magnitude having an output member to transmit pressure;

receiving means having an input member to receive pressure;

interruptable path means having an input to receive the binary input signals and operable upon receipt of signals of a first characteristic to fully open a flow path between the output member and the input member for a first pulse width modulated control period and upon receipt of signals of a second characteristic to completely close the flow path between the output member and the input member for a second pulse width modulated control period, the duration of the first pulse width modulated control period compared to the duration of the second pulse width modulated control period causing the pressure at the receiving means to be of the desired magnitude wherein said interruptable path means includes a valve having a rotatable shaft with first and second ports formed therein and a housing member around said rotatable shaft with first and second ports formed therein the second port of the housing means lying adjacent of the second port of the shaft during all positions of rotation of the shaft; means rotating the shaft between first and second positions, in the first position the first port of the housing means being aligned with the first port of the shaft and in the second position the first port of the housing means being non-aligned with the first port of the shaft.

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**4,590,971**

## INSULATED PIPELINE

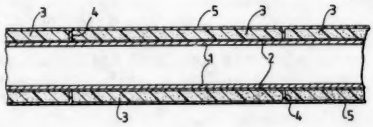
**George A. Webster, Aberdeen, and Brian J. Wadie, Newton, both of Great Britain, assignors to Webco Industrial Rubber Limited, Scotland**

**Filed Dec. 22, 1983, Ser. No. 564,162**

**Claims priority, application United Kingdom, Dec. 23, 1982, 8236619; Sep. 6, 1983, 8323835**

**Int. Cl.[4] F16L *9/14***

**U.S. Cl. 138—149** **6 Claims**




1. An insulated pipeline having

a pipe,

a continuous coating of non-foamed resilient water-impermeable corrosion-resistant material around the pipe,

heat-insulating material disposed around the corrosion-resistant coating and isolated from the pipe by the corrosion-resistant coating, the heat-insulating material being in sections which are mutually spaced along the pipeline, and

a continuous abrasion-resistant jacket of protective non-foamed resilient water-impermeable material disposed around the heat-insulating material for protection against mechanical damage,

the corrosion-resistant coating and the protective jacket being bonded together by non-foamed water-impermeable resilient material extending between the sections of heat-insulating material so that the corrosion-resistant coating, the protective jacket and the resilient material together form a continuous non-foamed matrix which encloses and surrounds the sections of heat insulating material thereby to enclose and isolate each section of heat-insulating material from adjacent sections of heat-insulating material.

**4,590,972**

## WEFT INSERTING APPARATUS FOR JET LOOMS

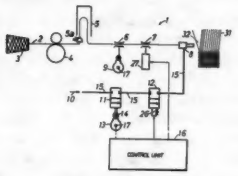
**Katsuhiko Sugita, and Tsutomu Sainen, both of Kanazawa, Japan, assignors to Tsudakoma Corp., Kanazawa, Japan**

**Filed Oct. 25, 1983, Ser. No. 545,404**

**Claims priority, application Japan, Oct. 28, 1982, 57-189570; Oct. 28, 1982, 57-189571; Nov. 22, 1982, 57-177682[U]; Dec. 8, 1982, 57-185442[U]; Sep. 28, 1983, 58-181646**

**Int. Cl.[4] D03D *47/30***

**U.S. Cl. 139—435** **16 Claims**



1. A weft inserting apparatus in a jet loom, comprising:

(a) a nozzle for inserting a stored weft yarn through a shed on a jet of fluid;

(b) weft insertion control means for controlling the starting and ending of the insertion of the weft yarn through the shed; and

(c) a control unit for determining a delay time based on a rotating condition of the jet loom at least under a transient operating condition of the jet loom, and for controlling said weft insertion control means to allow the weft yarn to be inserted for a prescribed period upon elapse of said delay time after an angle for starting apparent weft insertion.

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**4,590,973**

## LOOM AND METHOD OF WEAVING

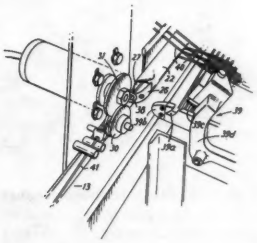
**Jack A. Wilkinson, Walsden, England, assignor to Milliken Research Corporation, Spartanburg, S.C.**

**Filed Dec. 19, 1984, Ser. No. 683,483**

**Claims priority, application European Pat. Off., Dec. 23, 1983, 83307975.5**

**Int. Cl.[4] D03D *47/12***

**U.S. Cl. 139—443** **2 Claims**



1. Apparatus to weave stiff tapes or bands comprising: a loom frame, means forming a shed in a warp array, means for supplying and passing a length of weft bands through said shed, a cutter mounted in said frame to sever the weft bands after passing through said shed, means for consolidating the weft bands between insertions through said shed and means to take up fabric after it has formed by said apparatus, said means forming a shed in warp array including a tension equalizing warp band supply system having a series of rotatably mounted spools maintained in side-by-side frictional engagement by

springs, said means for consolidating the weft bands includes a reciprocating sley and reed with a pair of weft band supply rolls in operative engagement with one another and mounted thereon, one of said supply rolls being adjustably mounted relative to the other of said supply rolls, one of said supply rolls having a groove in the periphery thereof and the other of said supply rolls having a width to fit into said groove and being driven by an air motor to intermittently rotate said pair of supply rolls, said means passing a length of weft bands including a hollow guide mounted on said sley on the side opposite to said pair of supply rolls and means for timing the reciprocating movement of the guide and the intermittent driving of the supply rolls in interrelationship such that the free or previously severed end of the strand is pushed into the guide when the latter is adjacent to the pair of supply rolls, and that the guide is retracted as the free end advances through the shed, the free end remaining inside the guide until it passes out of the shed, said free end of the hollow guide is enclosed and smooth to facilitate passage through the shed and has an opening in its upper surface giving access to its hollow interior, and that a guide is mounted adjacent to the pair of supply rolls to direct the free end of the strand in a downwardly inclined direction through the opening.

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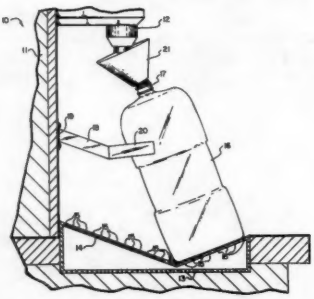
**4,590,974**

## BEVERAGE DISPENSER

**Robert B. Mathews, Salt Lake City, Utah, assignor to Carb-A-Drink International, Inc., Salt Lake City, Utah**

**Filed Dec. 22, 1983, Ser. No. 564,397**
**Int. Cl.[4] B65B *3/04***
**U.S. Cl. 141—1** **9 Claims**



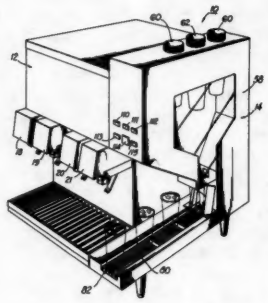
1. The method of dispensing beverage through a nozzle that must be kept sanitary to a customer's container, which has a filling opening and which may be contaminated without contaminating the nozzle from contact with the container which comprises placing a customer's container in filling position on a support spaced from the nozzzle a sufficient distance that the danger of contact of the container with the nozzle during placement of the container on and removal of the container from the support is negligible, inserting a sanitary disposable paper means between the nozzle and the filling opening of the container, dispensing beverage through the nozzle and disposable paper means into the container until it is filled with the desired quantity thereof, removing the container from the filling position, and discarding the disposable paper means.

**4,590,975**

## AUTOMATIC BEVERAGE DISPENSING SYSTEM

**William S. Credle, Jr., Stone Mountain, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.**

**Filed Jun. 13, 1984, Ser. No. 620,192**
**Int. Cl.[4] B65B *3/04***
**U.S. Cl. 141—1** **31 Claims**



1. An automatic beverage dispensing apparatus comprising:
(a) a narrow, modular assembly having a height and a depth substantially greater than its width, and having a uniform width along the entire height and depth thereof, said assembly including a cup dropping station, a beverage filling station, and conveyor means for moving a beverage-filled cup away from said beverage filling station;
(b) said conveyor means including a flat, narrow, horizontal surface located adjacent a lower portion of said assembly and extending from said cup dropping station to an operator station at a front end of said modular assembly, said surface being adapted to receive and support a cup dropped thereon while said cup is filled with a beverage and is then moved away from said beverage filling station; said conveyor means including means for automatically moving a cup on said surface from said cup dropping station to said operator station;
(c) said assembly including means for automatically dropping a cup onto said surface at said cup dropping station, said cup dropping means including cup holding means located adjacent an upper portion of said assembly, and also including a cup chute located below said cup holding means for guiding a dropped cup onto said surface in an upright condition;
(d) said assembly including means for automatically dispensing a beverage into a cup on said surface at said beverage dispensing station; and
(e) said cup chute including an opening extending through a vertical wall thereof and located above a cup dropped onto said surface at said cup dropping station, whereby ice can be dispensed through said opening and into a cup located on said surface in said cup dropping station.

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**4,590,976**

## EXHAUST APPARATUS FOR ELECTRIC LAMPS

**Kazuyuki Tanaka, Yokohama, and Noriaki Nishigaki, Yokosuka, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Oct. 26, 1984, Ser. No. 665,343**
**Claims priority, application Japan, Oct. 28, 1983, 58-202322**
**Int. Cl.[4] B65B *3/04***
**U.S. Cl. 141—66** **11 Claims**

1. An apparatus for simultaneously exhausting a plurality of electric lamp bulbs and then simultaneously introducing a gas into said bulbs, comprising:
a guide rail located along a predetermined conveyance path, said conveyance path having a plurality of working posi-

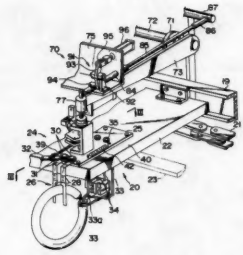
tions disposed at predetermined locations along said conveyance path;

a plurality of carriers which are transferred along said guide rail such that said carriers are temporarily stopped at said working positions, said carriers including a plurality of carrier heads, each of said carrier heads having

chuck means for removbly hoding a bulb, said bulb having an exhaust tube,

a carrier pipe member having a carrier pipe internal passage, said carrier pipe member having first and second ends, said first end being connectable to said exhaust tube when said bulb is being held by said chuck means, and said second end being open,

an exhaust tube connection means for connecting said first end of said carrier pipe member and said exhaust tube, and



a carrier pipe valve disposed in said carrier pipe member for opening and closing said carrier pipe internal passage; and

a plurality of working devices located at said working positions, said working devices including a plurality of working heads corresponding to said carrier heads, each of said working heads having

a working pipe member having a working pipe internal passage and having at least one end,

a working pipe connection means for detachably connecting said end of said working pipe member to said second end of said carrier pipe member when said carrier is stopped at said working position, and

a working pipe valve disposed in said working pipe member for opening and closing said working pipe internal passage.

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**4,590,977**

## APPARATUS FOR METERING BULK MATERIAL

**Edi Schmidt, Unterstammheim, Switzerland, assignor to SIG Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland**

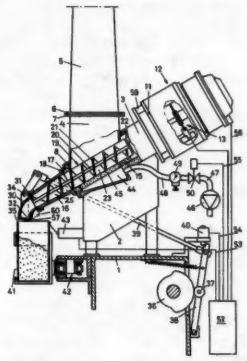
**Filed Mar. 19, 1985, Ser. No. 714,014**

**Claims priority, application Switzerland, Mar. 30, 1984, 1633/84**

**Int. Cl.[4] B65B *1/12***

**U.S. Cl. 141—129** **8 Claims**

1. In an apparatus for metering bulk material, including a downwardly open supply chute; a metering screw having an intake length portion for receiving bulk material from said supply chute and further having a discharge end; said metering screw being arranged for advancing the bulk material towards said discharge end; a motor operatively connected to said metering screw for imparting rotation thereto; and a tubular metering screw casing accommodating said metering screw and arranged for guiding therein the bulk material advanced by said metering screw during rotation thereof; the improvement wherein said metering screw is oriented obliquely with respect to the horizontal; the improvement further comprising a spout supported at said discharge end of said metering screw and being arranged for receiving the bulk material advanced thereby; said spout having a downwardly curving configuration and a substantially vertically downwardly oriented outlet opening; means defining a vacuum chamber situated underneath said intake length portion, a sieve separating said vacuum chamber from said intake length portion, a vacuum source, a conduit connecting said vacuum source to said vac-



uum chamber; valve means in said conduit for operatively connecting said vacuum source to and disconnecting it from said vacuum chamber and for maintaining a set vacuum constant in said vacuum chamber; and means for regulating the vacuum in said vacuum chamber by controlling said valve means as function of a variable representing a load on said motor.

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**4,590,978**

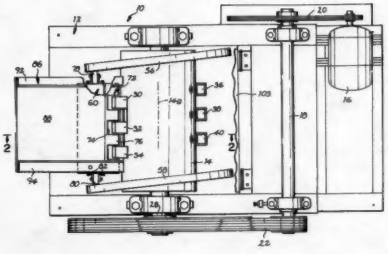
## WOOD SLAB CHUNKER

**Arthur H. Kintz, Bend, and John M. Vranizan, Portland, both of Oreg., assignors to Adnan M. Khashoggi, Riyadh, Saudi Arabia**

**Continuation of Ser. No. 339,379, Jan. 15, 1982, abandoned. This application Sep. 30, 1985, Ser. No. 781,209**

**Int. Cl.[4] B27L *11/00***

**U.S. Cl. 144—174** **5 Claims**



1. Apparatus for chunking a wood slab comprising

a frame,

a cylindrical drum mounted on said frame for rotation about the axis of the drum and powered means for rotating the drum,

a first series of teeth mounted on said drum, the teeth of said series being laterally spaced from each other and disposed in a row extending axially along a side of said drum, and further having matching rectangular outlines projecting a uniform distance from the drum surface and distal edges terminating the teeth occupying a line paralleling the

drum's axis, the teeth being equally laterally spaced a distance substantially equalling the width of a tooth,

a second series of teeth mounted on said drum, the teeth of said second series being laterally spaced from each other and disposed in a row extending axially along a side of the drum substantially diametrally opposite the side having the first series of teeth, the teeth of said second series having rectangular outlines matching the outlines of the teeth of the first series and projecting a uniform distance from the drum surface with distal edges terminating the teeth occupying a line paralleling the drum's axis, the teeth of said second series being equally laterally spaced a distance substantially equalling the width of a tooth in the series,

the teeth of said second series alternating with the teeth of said first series in a direction extending axially of the drum so that the path of a tooth in the second series with rotation of the drum is substantially centered between the paths of successive teeth in the first series,

slab support means operable to support a slab while such is chunked with said slab extending in a plane intersecting the periphery of the drum and including a reciprocating notched anvil disposed adjacent the surface of said drum having rectangular notches therein shaped to receive the teeth of said first and second series, and

means for reciprocating the anvil in a direction extending axially of the drum in synchronism with rotation of the drum whereby the notches of the anvil receive first the teeth of the first series and then the teeth of the second series with rotation of the drum,

the line occupied by the distal edges of the first series of teeth and the line occupied by the distal edges of the second series of teeth being spaced equal distances from the drum surface whereby with rotation of the drum cuts produced by the distal edges of the teeth of the first series are continued with cuts produced by the distal edges of the second series of teeth.

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**4,590,979**

## DEVICE FOR BARK-PEELING TREE TRUNKS OR THE LIKE

**Franz Attems, Anton Kleinoschegstrasse 8, A-8051 Graz, Austria**

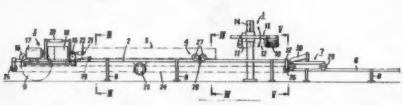
**PCT No. PCT/AT84/00014, § 371 Date Jan. 8, 1985, § 102(e) Date Jan. 8, 1985, PCT Pub. No. WO84/04485, PCT Pub. Date Nov. 22, 1984**

**PCT Filed Apr. 27, 1984, Ser. No. 697,590**

**Claims priority, application Austria, May 10, 1983, 1717/83**

**Int. Cl.[4] B27L *1/00***

**U.S. Cl. 144—208 F** **9 Claims**



1. An apparatus for debarking tree trunks, said device comprising

a primary support means for the tree trunk to be debarked, said primary support means comprising a pair of straight primary rails which have corresponding first ends and corresponding second ends; a supporting carriage which includes wheels mounted on said primary rails and which loosely supports a leading end of said tree trunk, said supporting carriage being movable along said primary rails to convey said leading end of the free trunk toward said corresponding second ends of said rails; a driving device which supports the trailing end of a tree trunk, said driving device being movable to convey said tree trunk toward said corresponding second ends of said primary rails, said driving device including rotator means for gripping the trailing end of said tree trunk and rotating said tree trunk, and

a debarking mechanism located near the corresponding second ends of said primary rails, said debarking mechanism including a rotatable knife roller which includes a cylindrical member defining a central axis therethrough and flat bars extending helically around said cylindrical member, the flat bars having outer surfaces which extend coaxially with respect to said central axis; and a pivot arm which supports said rotatable knife roller, said pivot arm being capable of supporting said knife roller above and between said primary rails such that its axis extends at an acute angle with respect to the longitudinal extent of said primary rails.

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**4,590,980**

## VARIABLE-WIDTH-BASE SOLID TIRE FOR ASSURING SEATED RIM MOUNTING ON VEHICLE WHEELS AND THE LIKE

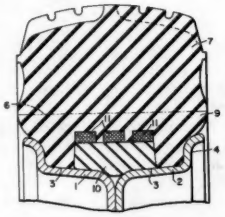
**Heinz Kühn, Waldeck, Fed. Rep. of Germany, assignor to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany**

**Filed May 11, 1984, Ser. No. 609,572**

**Claims priority, application Fed. Rep. of Germany, May 13, 1983, 3317375**

**Int. Cl.[4] B60C *7/08, 7/24***

**U.S. Cl. 152—323** **16 Claims**



1. A solid tire having a running pad for vehicle wheels that includes a rim as well as a wheel body means, said tire being made essentially of rubber as well as rubber-like synthetic materials, such tire being mounted upon the rim of the wheel body means engaging the tire also laterally thereof and having a tenacious hard set tire base of which hardness is greater than hardness of the running pad surrounding the base of the tire, comprising: at least one zone of reduced hardness by which width of the tire base is variable in order to be able to equalize width tolerances of the tire base as well as the rim; said at least one zone of reduced hardness forming part of an inside peripheral surface of the solid tire to allow adaptation to diameter as well as width of the rim to avoid having the tire loosen itself so as to turn or rotate especially relative to the rim which would lead to premature and untimely wear; and tension-proof strength carriers that surround an outer periphery of said at least one zone of reduced hardness and that are positioned to take up considerable peripheral and circumferential forces in order to thus avoid a radially outward bulging of said zone of reduced hardness and to assure seating of the tire on the rim.

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**4,590,981**

## CAST BRAKE CROWN ROTOR AND METHOD OF PRODUCING SAME

**André Weber, Saverne, France, assignor to Kuhn S.A., Saverne, France**

**Filed Dec. 15, 1983, Ser. No. 561,803**

**Claims priority, application France, Dec. 23, 1982, 82 21789**

**Int. Cl.[4] B22D *19/00***

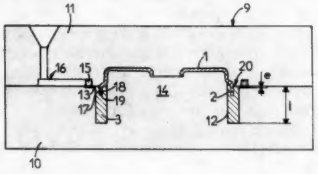
**U.S. Cl. 164—112** **14 Claims**

1. In a process of producing, with the aid of a mold, a brake

crown rotor having a substantially cylindrical cast metal crown and a round prefabricated sheet metal cover connected at its outer perimeter to said crown so that said cast metal crown surrounds said outer perimeter, said mold defining an annular cavity corresponding in form to said crown, and including a choke-forming flow channel operable to feed the liquid casting material into said cavity,

the steps comprising,

arranging said flow channel so that its height be relatively




small, and so that it extends into the vicinity of the upper portion of said cavity, and substantially all around said cavity,

mounting said cover such that its outer perimeter extends into said upper portion of said cavity in the vicinity of which said flow channel is disposed, and

pouring liquid casting material into said cavity,

whereby the crown will be cast in said cavity, and the cover will be interconnected with said crown substantially throughout the outer perimeter of said cover.

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**4,590,982**

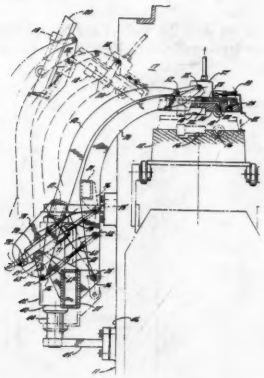
## AUTOMATIC CORE SETTING MACHINE

**William A. Hunter, 675 Aberdeen Rd., Inverness, Ill. 60067**

**Filed Dec. 11, 1984, Ser. No. 680,478**

**Int. Cl.[4] B22D *33/04***

**U.S. Cl. 164—253** **8 Claims**



1. A machine for automatically placing a core into an upwardly facing cavity in a mold located in a core setting station, said machine comprising a holder selectively operable to retain and release a core, an arm mounting said holder to swing laterally about a generally horizontal first pivot axis between a receiving position spaced upwardly and laterally away from a mold dwelling in said core setting station and a presetting position spaced directly above said mold, said holder being supported to turn on the free end portion of said arm about a second and substantially parallel axis between a core receiving orientation and a core placing orientation, said holder being disposed in said core receiving orientation and facing laterally away from said mold when said holder is in said receiving position whereby a core may be loaded into said holder, means for swinging the loaded holder laterally toward said mold and downwardly about said first pivot axis from said receiving position to said presetting position, mechanism responsive to lateral and downward swinging of said holder about said first pivot axis to cause said holder to turn about said second pivot axis from said receiving orientation to said placing orientation, said holder being disposed in said placing orientation and facing downwardly when said holder is in said presetting position, actuator means for thereafter causing said holder to move downwardly along a substantially linear path to place the core in the cavity in said mold, and means for causing the holder to release the core into the cavity.

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**4,590,983**

## PRECISION VACUUM MELTING AND CASTING FURNACE WITH A MELTING CHAMBER AND A CASTING CHAMBER

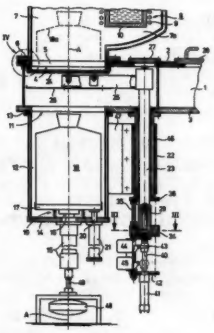
**Wolfgang Reuter, Niddatal, and Manfred Hartmann, Gelnhausen, both of Fed. Rep. of Germany, assignors to Leybold-Heraeus GmbH, Cologne, Fed. Rep. of Germany**

**Filed Apr. 25, 1985, Ser. No. 727,023**

**Claims priority, application Fed. Rep. of Germany, May 12, 1984, 3417731**

**Int. Cl.[4] B22D *27/15, 37/00***

**U.S. Cl. 164—258** **5 Claims**



1. In a precision vacuum melting and casting furnace, an arrangement comprising: a melting chamber containing melting means; a casting chamber positioned below said melting chamber and being raisable, lowerable, and pivotable outward to a side; a valve chamber having a vacuum valve; said casting chamber communicating with said melting chamber through said valve chamber; a lift platform for raising a mold up under said melting means and located in said casting chamber; lifting means for said casting chamber; an activating rod for said vacuum valve; a hollow vertical shaft attached to said valve chamber; said rod activating said vacuum valve extending vacuum-tight through said shaft; and sleeve means guiding said casting chamber and being positioned at an outer surface of said shaft.

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**4,590,984**

## DUMMY BAR DISCONNECTING ARRANGEMENT

**Michael Poran, Westwood, N.J.; Carl Langner, Monsey, N.Y., and Stephen Karolyi, Clifton, N.J., assignors to SMS Concast Inc., Montvale, N.J.**

**Continuation of Ser. No. 325,253, Nov. 27, 1981, abandoned. This application Feb. 6, 1984, Ser. No. 577,111**

**Int. Cl.[4] B22D *11/08***

**U.S. Cl. 164—426** **20 Claims**

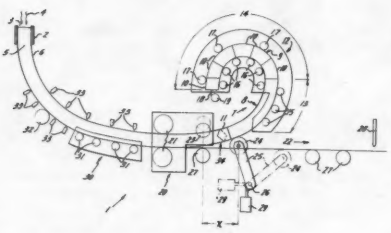
1. A continuous casting installation comprising:

(a) a mold having an inlet end for molten metal and an outlet end for a continuously cast strand;

(b) a dummy bar for closing said outlet end prior to admitting molten metal into said mold and for forming a connection with the strand;

(c) withdrawal means for withdrawing said dummy bar and the strand from said mold and conveying the strand along a predetermined path;

(d) disconnecting means downstream of said withdrawal means for separating the strand and said dummy bar, said



disconnecting means including first and second members movable between respective first and second rest positions out, and on opposite sides of, said path, and respective first and second operative positions in which at least one of said members is at least partially in said path and said members cooperate to separate the strand from said dummy bar; and

(e) a counterweight biasing said second member to said second operative position.

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**4,590,985**

## APPARATUS FOR HORIZONTALLY AND INTERMITTENTLY WITHDRAWING CAST STEEL STRAND FROM HORIZONTAL MOLD OF HORIZONTAL TYPE CONTINUOUS CASTING MACHINE

**Akira Honda, Kamakura; Yasuo Yanagihashi, Tokyo, and Shinobu Kumagai, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

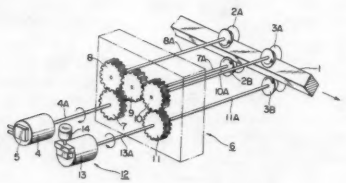
**PCT No. PCT/JP84/00525, § 371 Date Jun. 27, 1985, § 102(e) Date Jun. 27, 1985, PCT Pub. No. WO85/01900, PCT Pub. Date May 9, 1985**

**PCT Filed Oct. 30, 1984, Ser. No. 755,332**

**Claims priority, application Japan, Oct. 31, 1983, 58-202682**

**Int. Cl.⁴ B22D *11/04, 11/128***

**U.S. Cl. 164—440** **3 Claims**



1. In an apparatus for horizontally and intermittently withdrawing a cast steel strand from a horizontal mold of a horizontal type continuous casting machine, which comprises:

at least one pair of pinch rolls for horizontally and intermittently withdrawing said cast steel strand from said horizontal mold by means of a plurality of cycles each comprising one pull for a prescribed period of time, one pause for a prescribed period of time and one push for a prescribed period of time; and

a driving device for driving said at least one pair of pinch rolls through a driving force transmitting means in response to said one pull, said one pause and said one push in each cycle;

the improvement comprising:

a braking means (**12**) for imparting to said driving device (**4**) a braking force proportional to the number of rotations of said driving device (**4**), during said prescribed period of time of said one pull in each cycle of said cast steel strand (**1**) from said horizontal mold by means of said at least one pair of pinch rolls (**2A, 2B; 3A, 3B**), to prevent said cast steel strand (**1**) from being pulled from said horizontal mold over said prescribed period of time of said one pull, said braking force of said braking means (**12**) being smaller than the driving force of said driving device (**4**), and said braking means (**12**) comprising:

an oil brake (**13**) which interlocks with said driving device (**4**) and rotates in the same direction as the rotating direction of said driving device (**4**);

an oil tank (**14**) for receiving brake oil for driving said oil brake (**13**);

two conduits (**15, 16**), which communicate said oil brake (**13**) to said oil tank (**14**), for introducing the brake oil in said oil tank (**14**) into said oil brake (**13**) in response to the number of rotations of said oil brake (**13**) and feeding the brake oil thus introduced into said oil brake (**13**) back to said oil tank (**14**) from said oil brake (**13**);

a throttle valve (**17**) provided in the middle of one of said two conduits (**15, 16**); and

a check valve (**18**), which opens only during said prescribed period of time of said one push in each cycle of said cast steel strand (**1**), provided in parallel with said throttle valve (**17**) in the middle of said one of said two conduits (**15, 16**).

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**4,590,986**

## ROLLER GUIDE FOR CONTINUOUS CASTING INSTALLATION

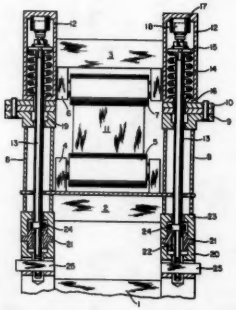
**Heinrich Scholz, Grevenbroich, and Günter Flemming, Erkrath, both of Fed. Rep. of Germany, assignors to SMS Concast Inc., Montvale, N.J.**

**Filed Jan. 23, 1984, Ser. No. 573,057**

**Claims priority, application Fed. Rep. of Germany, Feb. 2, 1983, 3303386**

**Int. Cl.⁴ B22D *11/12***

**U.S. Cl. 164—448** **22 Claims**



1. A roller guide, particularly for use in continuous casting installations for steel, said guide comprising:

(a) a first guide member including a first carrier, and at least one first guide roller supported by said first carrier, said first guide member resting on a support;

(b) a second guide member including a second carrier, and at least one second guide roller supported by said second carrier, said second guide member being mounted on said first guide member in such a manner that said first and second rollers cooperate to define a guide passage, and

said second guide member being movable towards and away from said first guide member;

(c) a plurality of rods arranged to transmit stresses between said first and second guide members, each of said rods having an end face in the region of said second guide member;

(d) first biasing means arranged to act on said rods and to urge said second guide member towards said first guide member;

(e) second biasing means for moving said second guide member away from said first guide member against the action of said first biasing means, said second biasing means being arranged to bear against said end faces; and

(f) connecting means for releasably connecting said rods, and thereby said first guide member, to the support.

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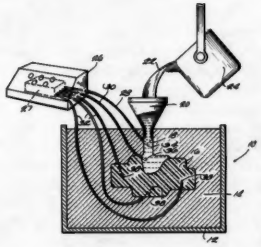
**4,590,987**

## METHOD AND APPARATUS FOR DETERMINING FLOW PATTERN OF MOLTEN METAL CASTING CHARGE

**Francis V. Bailey, Oak Creek, and John J. Waskiewicz, Wauwastosa, both of Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.**

**Filed Mar. 10, 1983, Ser. No. 473,770**
**Int. Cl.[4] B22D *2/00***
**U.S. Cl. 164—457** **8 Claims**



1. Apparatus for determining the flow pattern of an electrically conductive molten material as the molten material is introduced into a mold cavity of an electrically insulating mold having an inlet opening for the molten material, said apparatus comprising first electrical conduction sensing means adapted to be positioned in the vicinity of the inlet opening of the mold cavity, a plurality of second electrical conduction sensing means respectively adapted to be positioned at different predetermined locations in the mold cavity, and electrically operated recording means electrically connected to said first and second electrical conduction sensing means and being operable to start a timing cycle in response to the molten material being introduced into the mold cavity contacting said first electrical conduction sensing means and to record the elapsed time from the start of the timing cycle to the time the molten material reaches each of the predetermined locations in the mold cavity in response to the molten material contacting said second electrical conduction sensing means.

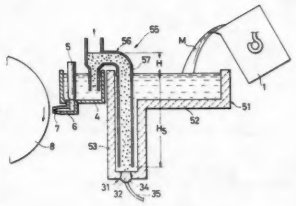
6. A method for determining the flow pattern of an electrically conductive molten material as the molten material is introduced into a mold cavity of an electrically insulating mold, said method including the steps of producing an electrical starting signal for starting a timing cycle in response to an electrical conduction sensing means being contacted by the molten material as it is first introduced into the mold cavity, producing a plurality of electrical timing signals in response to the molten material contacting electrical conduction sensing means positioned at different predetermined locations in the mold cavity, and providing means for receiving the starting and timing signals and recording the elasped time between the starting signal and each of the timing signals.

**4,590,988**

## METHOD AND APPARATUS FOR SUPPLYING MOLTEN METAL IN THE MANUFACTURE OF AMORPHOUS METAL RIBBONS

**Hiromi Fukuoka; Keisuke Asano, and Hideo Ide, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Filed Sep. 18, 1984, Ser. No. 651,766**
**Claims priority, application Japan, Sep. 26, 1983, 58-176351**
**Int. Cl.[4] B22D *11/10, 11/06***
**U.S. Cl. 164—463** **14 Claims**



1. In a method of manufacturing amorphous metal ribbons by ejecting molten metal from a nozzle attached to a tundish onto the surface of a rapidly moving cooling body, an improved method of supplying the molten metal to the tundish, which comprises:

pouring the molten metal from a ladle into an intermediate vessel separate from and positioned beside the tundish; and

supplying the molten metal from the intermediate vessel to the tundish by placing the lower end of an ascension pipe of a gas-lift pump into the molten metal in the intermediate vessel and placing the lower end of the discharge pipe of the gas-lift pump in the molten metal in the tundish, supplying bubbles of an inert gas to the lower end of the ascension pipe for lifting molten metal from the intermediate vessel, transferring said molten metal and then down into the tundish, and venting the gas from the top of the gas-lift pump.

2. In an amorphous metal ribbon manufacturing apparatus having a rapidly moving cooling body and a tundish having a nozzle to eject molten metal onto the surface of the cooling body, and a molten metal supply means for supplying molten metal, an apparatus for supplying the molten metal from said supply means to the tundish which comprises:

an intermediate vessel separate from the tundish and disposed beside the tundish and positioned for receiving the molten metal from the supply means; and

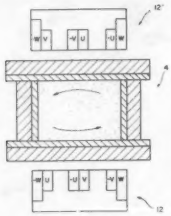
a gas-lift pump for supplying the molten metal from said intermediate vessel to the tundish, said gas-lift pump having a pump member placed over said intermediate vessel and the tundish and being constituted by an ascension pipe and a discharge pipe, said pipes being spaced laterally from each other and being connected at the upper ends, said ascension pipe having the lower end opening into said intermediate vessel adjacent the bottom thereof and said discharge pipe having the lower end opening into the tundish at a level below the normal level of molten metal in the tundish, vent means at the top of said pump member for discharging gas therefrom, and means adjacent the bottom of said ascension pipe for supplying bubbles of inert gas into the bottom of said ascension pipe.

4,590,989

## ELECTROMAGNETIC STIRRER

Sumio Kobayashi, Hyogo, Japan, assignor to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Aug. 9, 1984, Ser. No. 639,079
Claims priority, application Japan, Aug. 17, 1983, 58-150681
Int. Cl.[4] B22D 27/02
U.S. Cl. 164—504 10 Claims



6. A continuous casting machine having first and second electromagnetic stirrers located on opposite sides thereof, each stirrer comprising:

an elongated core having a center, sides and ends;

at least one slot formed in one side of said core and located adjacent the center of the core;

first and second poles on opposite sides of said slot;

first coil means for generating even function components of travelling wave current distribution including first and second coils wound, respectively, around said first and second poles and each having a winding portion adjacent an end of said core and a winding position disposed in said at least one slot; and

an additional coil means for generating odd function components of travelling wave current distribution including a third coil having coil portions adjacent opposite ends of said core;

the distance between the coil portions of said third coil adjacent opposite ends of said core being approximately twice as great as the distance between the winding portion adjacent said end and the winding portion in said slot of each of said first and second coils;

wherein the polarities of said even function components of said first stirrer are opposite to the polarities of said even function components of said second stirrer and the polarities of the odd function components are the same on each stirrer.

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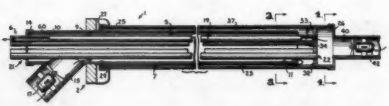
4,590,990

## VENTILATION HEAT RECOVERY SYSTEM

John A. George, R.R. 1, Uniontown, Kans. 66779

Filed Oct. 25, 1984, Ser. No. 664,757
Int. Cl.[4] F24H 3/02; F24F 7/08, 13/06
U.S. Cl. 165—54 1 Claim



1. A ventilation heat recovery system for use in a livestock building or the like having surrounding walls, a floor, and ceiling; said system comprising:

(a) an elongate inlet air duct being adapted to extend into the building and to be supported by the ceiling and the walls; said inlet duct being open at a first end to the ambient atmosphere;

(b) an elongate outlet tube bundle extending longitudinally within said inlet duct; said tube bundle including a plurality of tubes arranged in a circular pattern relative to a longitudinal axis of said inlet duct and including a central tube being axially aligned with said inlet duct; said tube bundle being adapted to be open at a first end into the ambient atmosphere and at a second end to the atmosphere of the building;

(c) an outer sleeve being adapted to extend at a first end thereof from a building wall into the building and axially surrounding said inlet duct and said tube bundle within the building; said outer sleeve having a second end adapted to be opened to the atmosphere of the building; said outer sleeve having a plurality of air distribution orifices generally horizontally spaced along a substantial portion of a length of said outer sleeve;

(d) a stationary tube sheet being received in said outer sleeve near said second end thereof between said outer sleeve second end and said inlet duct second end; said tube sheet having a plurality of orifices through which said tubes extend near said tube bundle second end; said tube sheet defining a transition zone between said inlet duct second end and said tube sheet; said transition zone providing incoming air flow communication between said inlet duct and said outer sleeve and to said distribution orifices; said outer sleeve and inlet duct defining a distribution channel therebetween extending generally from said transition zone to said building wall;

(e) said inlet duct having a branch duct being integral therewith and open to said inlet duct and to the ambient atmosphere;

(f) a first fan being postioned in said branch duct for forcing air from the ambient atmosphere into said inlet duct in heat-exchanging relationship with said tube bundle, and to said transition zone and along said distribution annulus and through said distribution orifices;

(g) a reducing member being connected to said outer sleeve second end and defining an opening to the building atmosphere to provide flow communication between said outer sleeve and the building atmosphere; and

(h) a second fan being positioned in said reducing member for forcing air from the building into said outer sleeve second end through said tube bundle tubes in heat-exchanging relationship with said inlet duct and into the ambient atmosphere.

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4,590,991

## FLEXIBLE STABILIZER FOR DEGRADED HEAT EXCHANGER TUBING

Frank W. Cooper, Jr., Monroeville; Thomas M. Epperson, Penn Township, Lancaster County; Gregory L. Calhoun, Allegheny Township, Armstrong County, and Harvey D. Kucherer, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

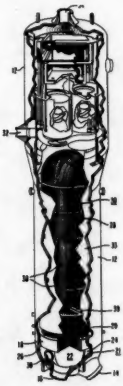
Filed Jan. 9, 1984, Ser. No. 569,078
Int. Cl.[4] F28F 7/00
U.S. Cl. 165—69 15 Claims

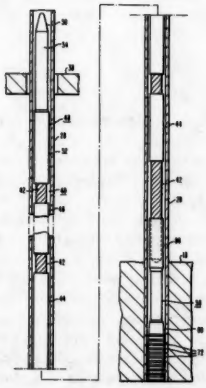
1. In combination with a tube-type steam generator for a water cooled nuclear reactor, said steam generator comprising a shell member enclosing a plurality of closely spaced rigid tubes, said tubes having heated primary water flowing therethrough during normal operating conditions, said shell member during normal operating conditions having a secondary cooling flow of secondary cooling water entering therein at a high velocity and in contact with the exterior surfaces of said tubes to remove heat therefrom and to exit from said shell member as steam moving at a high velocity, the improved tube vibration stabilizer for a damaged or degraded tube comprising:

at least one stabilizer mounting device positioned at a predetermined location within said damaged or degraded tube and operable to shut off the flow of primary water through said damaged or degraded tube; and

an elongated vibration stabilizer loosely mounted within said damaged or degraded tube and retained in axial position

within said damaged or degraded tube by said stabilizer mounting device, said vibration stabilizer comprising an elongated flexible member which slidably extends within said damaged or degraded tube, said stabilizer being so spaced with respect to the inner wall of said damaged or degraded tube that during normal operation of said steam generator vibrations of said damaged or degraded tube





will cause said vibration stabilizer to mechanically interact with said damaged or degraded tube, and the mechanical interaction between said elongated flexible member and said damaged or degraded tube surrounding said elongated flexible member operating to significantly reduce vibration in said damaged or degraded tube which can occur due to flow induced vibration caused by said secondary cooling flow.

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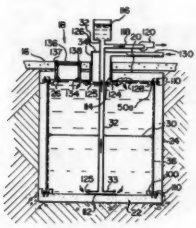
**4,590,992**

## THERMAL STORAGE SYSTEMS WITH ANTIBLENDING DISC

**Robert T. Tamblyn, 12 Littlebrook Court, R.R. #2, Gormley, Ontario, L0H 1G0, Canada**

**Filed Jun. 29, 1984, Ser. No. 626,429**
**Claims priority, application Canada, May 2, 1984, 453356**
**Int. Cl.[4] F28D *21/00*; F24J *3/02***
**U.S. Cl. 165—104.19** **22 Claims**

1. In a system for conditioning a load using circulation of temperature controlled water, thermal storage means for holding varying volumes of water at different temperatures and comprising at least one tank of constant vertical cross-section and having opposed ends, disc means between the ends of said tank of separating the tank into first and second variable volume chambers and for preventing blending of water at different temperatures in the chambers, conduit means for selectively feeding water into one chamber while simultaneously removing water from the other chamber, said disc means moving in said tank in accordance with the feeding and with-



drawal of water from the chambers whereby the volume of water in each chamber may vary but the total volume of water in the tank is substantially constant, and means for maintaining said disc means substantially perpendicular to the vertical axis of said tank during its movement within the tank; said conduit means including one conduit extending centrally within said tank with an opening adjacent the inside surface of one tank end, said disc means having a central aperture therein adapted to closely surround said one conduit which conduit provides vertical stabilizing means for said disc means.

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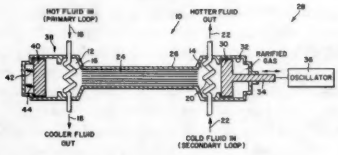
**4,590,993**

## HEAT TRANSFER DEVICE FOR THE TRANSPORT OF LARGE CONDUCTION FLUX WITHOUT NET MASS TRANSFER

**Ulrich H. Kurzweg, Gainesville, Fla., assignor to University of Florida, Gainesville, Fla.**

**Filed Oct. 23, 1984, Ser. No. 664,048**
**Int. Cl.[4] F28D *15/00***
**U.S. Cl. 165—104.31** **26 Claims**




8. A heat transfer device comprising:

a pair of fluid reservoirs adapted for positioning at respective locations of differing temperature between which it is desired to transfer heat;

at least one duct connecting said fluid reservoirs and having walls of a material which conducts heat;

a quantity of heat transfer fluid filling said duct and at least portions of said reservoirs; and

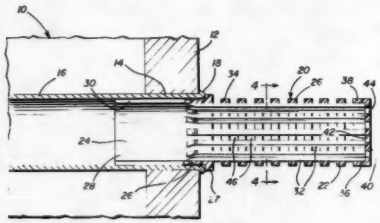
an oscillatory displacement device acting on fluid within one of said reservoirs for causing working fluid to alternately move axially in opposite directions within said duct, the extent of fluid movement within said duct being less than the length of said duct.

4,590,994

## HEAT EXCHANGER TUBE STRAINER

Elmer L. Champion, P.O. Box 71, Bronte, Tex. 76933

Filed Aug. 17, 1984, Ser. No. 641,833
Int. Cl.[4] F28F *19/00*
U.S. Cl. 165—119 2 Claims



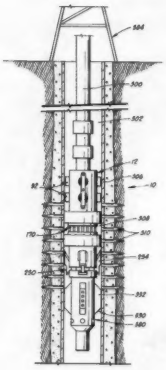
1. In combination with a heat exchanger of the type including at least one heat transfer tube having an inlet end opening outwardly through a tube sheet or tube end plate, a strainer assembly for preventing the intake of soolid and semi-solid material of a size greater than a predetermined maximum into said inlet end, said strainer assembly including an elongated tubular body having first and second end portions and midlength outwardly projecting flange means on opposite sides of which said end portions are disposed, said first end portion being telescoped into said inlet end with said flange means abutted against portions of said heat exchanger disposed about the terminal end of said inlet end, said first end portion being open and frictionally telescoped within said inlet end, said second end portion including an end wall, said end wall defining spaced apart first openings formed therethrough of a size smaller than said predetermined maximum size and said second end portion defining a plurality of circumferentially and longitudinally spaced second openings formed therethrough also of a size smaller than said predetermined size, said first end portion including first and second contiguous sections adjacent and remove from said flange means, said second section being slightly diametrically enlarged relative to said first section and including circumferentially spaced longitudinal slots formed therein opening endwise outwardly through the terminal end of said first end portion, said longitudinal slots serving to allow slight inward radial displacement of the portions of said second section defined between adjacent slots and to thereby allow said second section to be tightly frictionally telescoped into said inlet end, said second end portion including a plurality of parallel, circumferentially spaced and longitudinally extending bars with the ends of said bars remote from said end wall lengthwise overlapping and anchored relative to the inner surfaces of said first section, a cylindrical body portion telescoped over and anchored relative to the outer surfaces of the terminal ends of said bars remove from said first section, said second end portion also including a plurality of axially spaced ring sections telescoped over and secured to the outer surfaces of said bars intermediate said first section and cylindrical body portion, whereby circumferentially and longitudinally spaced generally radial openings are defined in said second end portion between adjacent bars and adjacent ring sections, the outer portions of said radial openings into circumferentially extending and outwardly opening channels defined between adjacent ring sections and the inner portions of said radial openings open into longitudinally extending channels defined between pairs of circumferentially adjacent bars, said end wall extending across the end of said cylindrical body portion remote from said first section.

4,590,995

## RETRIEVABLE STRADDLE PACKER

Robert T. Evans, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Mar. 26, 1985, Ser. No. 716,019
Int. Cl.[4] E21B *33/124, 33/129*
U.S. Cl. 166—127 5 Claims



1. A retrievable straddle packer for use in wells, comprising:
an hydraulic slip assembly;
a tubular injection mandrel assembly secured to said hydraulic slip assembly and extending downardly therefrom, said mandrel assembly having a plurality of injection ports extending through the wall thereof and a plurality of bypass slots extending through the wall thereof below said injection ports;
upper packer element means disposed on said mandrel assembly adjacent to said hydraulic slip assembly;
injection spacer means disposed on said mandrel assembly adjacent to and below said upper element means, said injection spacer means including upper and lower packer compression rings separated by a plurality of longitudinal struts defining a plurality of apertures therebetween;
lower packer element means disposed on said mandrel assembly adjacent to and below said injection spacer means;
a slip body disposed on and splined to said mandrel assembly below said lower packer element means;
a plurality of slips disposed on said mandrel assembly, the upper ends of said slips being longitudinally slidably secured to said slip body and the lower ends of said slips being radially slidably secured to a split ring collar assembly therebelow surrounding said mandrel assembly;
a drag block assembly disposed on said mandrel assembly below said split ring collar assembly and secured thereto;
J-slot means comprising lug means asociated with one of said mandrel assembly and said drag block means, and a cooperating J-slot associated with the other of said mandrel assembly and said drag block means; and
a bypass assembly disposed on said mandrel assembly below said drag block means and secured thereto, said bypass assembly including bypass ports through the wall thereof adapted to communicate with said bypass slots of said mandrel assembly when aligned therewith.

4,590,996

## USE OF POLYALKOXY SULFONATE SURFACTANTS FOR INHIBITION OF SCALE FORMATION

Dennis H. Hoskin, Lawrenceville; L. Deane Rollmann, Princeton, both of N.J.; Gerald L. Shoemaker, Aurora, Ohio, and Kirk D. Schmitt, Pennington, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 13, 1984, Ser. No. 681,391
Int. Cl.[4] E21B *43/12*
U.S. Cl. 166—244.1 13 Claims

1. A process for inhibiting deposition of mineral scale in oil field formations and/or production equipment which comprises combining formation fluid produced or fluid containing precipitable mineral salt with a precipitation-inhibiting amount of at least one polyalkoxy sulfonate compound of the general formula:

$$(RO[R'O]_x(CH_2)_ySO_3)_zM$$

wherein R is a hydrophobe, R'O is a $C_2H_4O$ or a $C_3H_6O$ group or some combination thereof, M is a monovalent or divalent cation, x is 2 to 10, y is 0 to about 4 and z is 1 or 2.

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4,590,997

## CONTROLLED PULSE AND PEROXIDE FRACTURING COMBINED WITH A METAL CONTAINING PROPPANT

Lawrence R. Stowe, Plano, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 28, 1985, Ser. No. 695,600
Int. Cl.[4] E21B *43/263, 47/02*
U.S. Cl. 166—250 27 Claims

1. A method for fracturing a subterranean formation penetrated by at least one well which extends from the surface of the earth to the formation comprising:

(a) placing into a well near the productive interval a means for fracturing the formation by a pressure loading rate sufficient to create multiple fractures;

(b) maintaining the peak pressure load sufficiently above the in-situ stress pressure but below the rock yield stress for a time sufficient to allow fluid penetration and extension of fractures;

(c) inserting into said fractures, a proppant having mixed therein at least one metal value sufficient to react with stabilized hydrogen peroxide to form a gaseous medium; and

(d) injecting a hydrogen peroxide solution containing a stabilizing agent into the fractures formed, which stabilizing agent reacts with metal values combined with said proppant resulting in a substantial reduction of said agent in the solution, and the resultant substantially unstabilized hydrogen peroxide decomposes to form a gaseous medium which expands and extends the fractures.

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4,590,998

## TUBING VALVE

Bobby E. Hopper, Rte. 1, Box 1660, Pearland, Tex. 77584

Filed Sep. 27, 1983, Ser. No. 536,177
Int. Cl.[4] E21B *34/12*
U.S. Cl. 166—331 15 Claims

1. Valve apparatus for use with a tubular passage comprising:

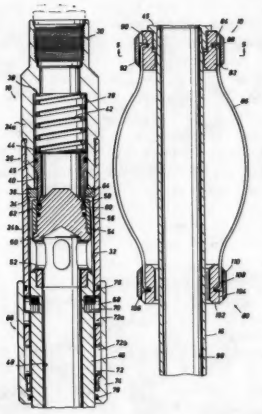
(a.) a first valve member including a passage therethrough and piston means therein;

(b.) a second valve member comprising a plug and passage means;

(c.) latch means, selectively operable to limit movement of said first and second valve members between a first configuration and a second configuration and to releasably lock said first and second valve members in either said first or second configurations; and

(d.) drag means to retard movement of one of said first and second valve members to permit movement of the other of said valve members to effect movement of said valve members between said first and second configurations;

(e.) wherein said first and second valve members may move between, and by said latch means be locked in, said first configuration in which said plug engages said first valve



member to close said passage in said first valve member and fluid pressure communicating with said passage urges said first valve member piston means and second valve member into sealing engagement, and said second configuration in which said passage is open and fluid may communicate around said plug through said passage means.

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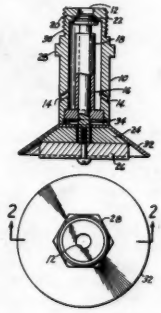
4,590,999

## FIRE EXTINGUISHING SPRINKLER VALVE

Alvin A. Snaper, 2800 Cameo Cir., Las Vegas, Nev. 89107

Division of Ser. No. 519,545, Aug. 2, 1983, abandoned. This application Jul. 29, 1985, Ser. No. 761,293
Int. Cl.[4] G05D *23/26*
U.S. Cl. 169—37 14 Claims



1. A sprinkler valve for use in fire extinguishing systems comprising:

a valve housing having an inlet, an outlet and a passageway connecting said inlet and outlet;

connecting means connecting said inlet to a water supply system;

spray nozzle means connected to said outlet for spraying water supplied to said sprinkler valve;

flow interrupting means for interrupting the flow of water through said passageway from said inlet to said outlet;

magnetically attractive material on said flow interrupting means;

thermally responsive magnetic means mounted on an external portion of said valve housing exposed to ambient air cooperating with said magnetically attractive material on said interrupting means to open or close said passageway;

said thermally responsive magnetic means being constructed of a material which loses its magnetic permeability at a preselected temperature;

said magnetically attractive material on said flow interrupting means being magnetically attracted to said thermally responsive magnetic means so that said passageway is normally closed preventing the flow of water to said outlet;

said thermally responsive magnetic means losing its magnetic attraction at said preselected temperature caused by external heat from a fire proximate said valve;

whereby said valve opens at or above said preselected temperature permitting water to be distributed from said nozzle connected to said outlet to extinguish said fire, said valve closing when fire is extinguished and the temperature proximate said valve falls below said preselected temperature to shut off said valve.

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**4,591,000**

## AUTOMATIC FIRE-EXTINGUISHING DEVICE FOR OIL BURNER

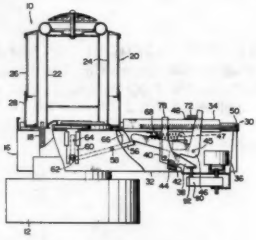
**Kazuharu Nakamura, Nagoya, and Yutaka Nakanishi, Kounan, both of Japan, assignors to Toyotomi Kogyo Co., Ltd., Aichi, Japan**

**Filed Sep. 26, 1984, Ser. No. 654,450**

**Claims priority, application Japan, Sep. 26, 1983, 58-149420[U]**

**Int. Cl.⁴ A62C *35/02***

**U.S. Cl. 169—54** **9 Claims**



1. An automatic fire-extinguishing device for an oil burner comprising:

a retaining element adapted to be moved with the operation of a vibration sensing means;

a lift lever for allowing a combustion cylinder means of said oil burner to be vertically moved with respect to a wick receiving case of said oil burner;

a driving lever adapted to be detachably engaged with said retaining element to operate said lift lever to carry out the vertical movement of said combustion cylinder means, said driving lever being held at the stationary position to allow said combustion cylinder means to be disposed on said wick receiving case through said lift lever when said retaining element is moved to cause said driving lever to be engaged with said retaining element and moved from the stationary position to upward move said combustion cylinder means through said lift lever when said retaining element is moved to cause said driving lever to be disengaged from said retaining element;

a movable shielding plate adapted to be released from the stationary position to cover said wick receiving case to carry out the fire-extinguishing of said oil burner when said lift lever upward moves said combustion cylinder means to define between said combustion cylinder means and said wick receiving case a space sufficient to receive said shielding plate therein;

an operation lever rotatably mounted on said movable shielding plate, said operation lever being adapted to move said driving lever to the stationary position to engage said driving lever with said retaining element when said movable shielding plate is set at the stationary position;

a stopper means provided to limit the rotation of said operation lever in the direction of holding said movable shielding plate at the stationary position; and

a movable lever means arranged within the range of movement of said operation lever determined when said movable shielding plate is set at the stationary position, and adapted, when it is moved in the direction of fire-extinguishing of said shielding plate by said operation lever, to thereby move said retaining element to release the engagement between said retaining element and said driving lever to upward move said combustion cylinder means through said lift lever, so that the automatic fire-extinguishing may be carried out.

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**4,591,001**

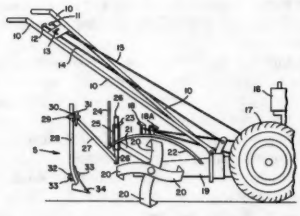
## GARDEN TILLERS

**Jesse J. Barbee, Rte. 1, Box 424, Phenix City, Ala. 36867**

**Filed Dec. 21, 1984, Ser. No. 663,598**

**Int. Cl.⁴ A01B *35/18, 69/02, 33/16***

**U.S. Cl. 172—43** **4 Claims**



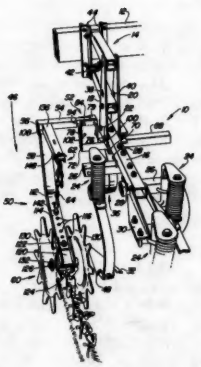
1. A garden tiller comprising forwardly disposed powered wheels and rearwardly disposed rotary cultivating tines, an arcuate shield covering the upper portion of said tines, and a drag stake mount for receiving a drag stake located rearwardly of said rotary tines, said drag stake mount comprising a drag stake holder adapted to support and removably secure an attaching portion of a drag stake, a toolbar attachment assembly adapted to be removably supported by said drag stake mount, said toolbar attachment assembly comprising a connecting member correspondingly configured to said drag stake attaching portion for removable attachment with said drag stake holder, said toolbar attachment assembly further comprising upwardly and rearwardly diverging arms forming a generally V-shaped rear support bracket, said arms being connected at their forward ends to said connecting member and at their rear ends to a substantially horizontal, laterally disposed toolbar adapted to removably secure tools along its length, said rear support bracket with said toolbar attached thereto being adapted to be secured to said holder so as to extend upwardly and rearwardly from beneath said shield without said shield being removed.

4,591,002

## PIVOTING SHIELD ASSEMBLY

Harry M. Meinert, Urbandale, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Aug. 21, 1984, Ser. No. 642,984
Int. Cl.[4] A01B *39/26*
U.S. Cl. 172—510 16 Claims



1. In a cultivator having a frame adapted for forward movement over a field having rows of crops, earthworking tools transversely spaced on the frame and defining a crop row-receiving area, said tools for engaging the soil beside the row-receiving area, a shield assembly comprising:

a transverse arm having a first end and a distal end;

means hingedly supporting the first end of the arm on the frame for rocking between a first position wherein the distal end of the arm is located above the row-receiving area and a second position wherein said distal end is located above the earthworking tools and offset towards one side of the row-receiving area, said means hingedly supporting including a bracket fixed to the frame, and a pivot pin offset from the frame and connected to the bracket and to the first end of the arm for permitting the arm to rock with respect to the bracket about the axis of the pivot pin;

a shield including at least one plant-protecting surface;

means connecting the shield to the arm in trailing relation to said distal end of the arm for maintaining the surface in an upright attitude in the row-receiving area adjacent the tools when the arm is in the first position, and in a generally horizontal position above and offset towards said one side of the area when the arm is in the second position, said means connecting including pivot means for permitting the shield to rock vertically about a generally horizontal axis when the arm is in the first position and restraining the arm from substantial vertical rocking when the arm is in the second position.

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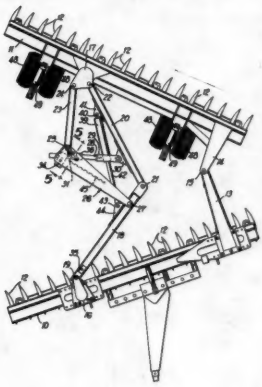
4,591,003

## OFFSET HARROW

Mark W. Broome, Rockmart, and George R. McKemie, Rome, both of Ga., assignors to Rome Industries, Inc., Cedartown, Ga.

Filed Feb. 15, 1985, Ser. No. 702,013
Int. Cl.[4] A01B *23/04*
U.S. Cl. 172—597 14 Claims

1. A harrow comprising front and rear gang carriers, means hingedly connecting said gang carriers near corresponding ends so that they may swing one relative to the other in a horizontal plane, a power linkage interconnecting said gang carriers near their other corresponding ends, said power linkage comprising front and rear stabilizers having pivotally connected ends and having other ends which are pivotally connected to the front and rear gang carriers whereby such carriers and said stabilizers may move in a common horizontal plane, a support beam having one end pivotally connected with the rear gang carrier, a latch support link having a pivotal connection with the other end of said support beam and also being pivotally connected to the front stabilizer to move therewith in said common horizontal plane, a latch bar having



swiveled sliding engagement with said latch support link and being pivotally connected with the rear stabilizer, an adjustable and lockable stop member on the latch bar serving to limit swinging movement of said gang carriers away from each other, and an extensible and retractable power device connected between said front and rear stabilizers and being operable to move the stabilizers in said common horizontal plane to position the harrow for transport and for soil-working.

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4,591,004

## PNEUMATIC PERCUSSION MACHINE

Bernard L. Glen, 60 van Beek Street, New Doornfontein, South Africa 2094

Filed May 16, 1984, Ser. No. 610,683
Claims priority, application South Africa, May 18, 1983, 83/3564
Int. Cl.[4] B25D *17/00*; E21B *1/00*
U.S. Cl. 173—17 12 Claims

1. A pneumatic percussion machine comprising:

an elongate hollow casing having a bit assembly at one end and a backhead at the other end, the backhead having a compressed fluid inlet and the bit assembly having an exhaust passage for compressed fluid;

a control rod extending axially into the casing area from the backhead;

a piston reciprocal within the casing area within the casing between the casing ends and having an axial opening in the backhead end along which it can reciprocate in sealing engagement with the control rod, an axial opening in the bit assembly end of the piston communicating with the periphery of the piston, an inwardly stepped circumferential recess situated between the bit assembly end and the backhead end, a first fluid passageway running from the inwardly stepped recess to the bit assembly and axial opening, and having a second fluid passageway running from the backhead end axial opening to the bit assembly end at a position radially adjacent the bit assembly end axial opening;

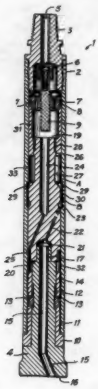
a first fluid chamber defined by the backhead, the casing and the backhead end of the piston;

a second fluid chamber defined by the bit assembly, the casing and the bit assembly end of the piston;

a third fluid chamber defined by the casing and the inwardly stepped recess of the piston;

a first fluid supply path from the inlet to the second fluid chamber, passing through the first chamber, the backhead end axial opening in the piston and the second fluid passageway when the piston is in sealing engagement with the bit assembly;

a second fluid supply path from the inlet to the third chamber, passing through the first chamber when the piston is in sealing engagement with the control rod;



a first fluid exhaust path from the second fluid exhaust chamber to the bit assembly exhaust passage when the piston is not in sealing engagement with the bit assembly; and,

a second fluid exhaust path from the third fluid chamber to the bit assembly exhaust passage through the first fluid passageway when the piston is in sealing engagement with the bit assembly;

wherein the movement of the piston under force of compressed fluid, in use, alternatively opens and seals the fluid supply paths and their associated exhaust paths to cause continuing piston reciprocation and to cause the piston to successively strike the bit assembly.

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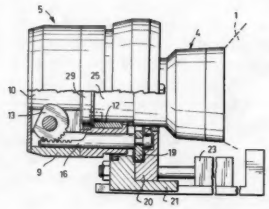
**4,591,005**

## DRILL ROD OPENING DEVICE FOR SECTIONAL-ROD DRILLING EQUIPMENT

**Ossi Pälviläinen, and Leo Häkkinen, both of Tampere, Finland, assignors to Oy Tampella AB, Tampere**

**Filed Jun. 3, 1983, Ser. No. 500,626**
**Claims priority, application Finland, Jul. 7, 1982, 822416**
**Int. Cl.[4] E21B *3/00***
**U.S. Cl. 173—164** **6 Claims**



1. A drill rod opening device (5) for sectional rod drilling equipment, comprising a coupling frame (9) coupled to a drilling machine (1) of the drilling equipment, said coupling frame (9) having a hole (10) going there through, said hole being adapted to receive a drill rod (6*a*), said drill rod being threaded into a drill rod shank (7) of the drilling machine (1), grasping means (13) being mounted in the coupling frame, said grasping means having locking and unlocking position, in said locking position said grasping means being extended into said hole of the coupling frame, in said locking position said rod being locked by said grasping means to said coupling frame, in said unlocking position of said grasping means said rod being allowed to move in relation to the coupling means, the coupling frame (9) being coupled to the drilling machine (1) rotatably and substantially undisplaceably in relation to the drill rod shank (7) and said grasping means (13) being adapted to lock the drill rod (6*a*) in the locking position axially undisplaceably to the coupling frame, the grasping means consists of eccentric wheels, which are mounted rotatably to the coupling frame and which are in engagement with sliding means, by which the eccentric wheels can be rotated between said locking position and said unlocking position.

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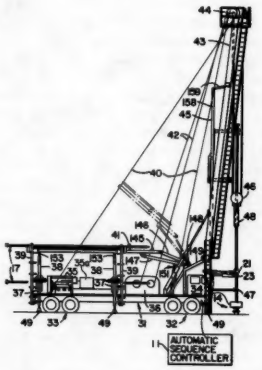
**4,591,006**

## WELL SERVICING RIG

**Stanley O. Hutchison; Paul V. Oldershaw, and James E. Hansen, all of Bakersfield, Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Continuation of Ser. No. 247,674, Mar. 26, 1981, abandoned.**
**This application Sep. 29, 1982, Ser. No. 427,096**
**Int. Cl.[4] E21B *19/20***
**U.S. Cl. 175—52** **31 Claims**




1. A totally contained movable rig, including a frame portion thereon, for servicing and drilling and for handling elongated well elements from a horizontal storage position to a vertical position in operating relationship with a well, or the reverse of said positions, comprising:

(a) horizontal storing means mounted on said frame of said movable rig for storing said well elements in horizontal position, said horizontal storing means including a pair of pipe rack arms pivotally mounted on each side of said frame of said movable rig so as to be pivoted about a vertical axis between stored position in alignment with said frame and operating position generally horizontal and perpendicular to said frame and a pair of crane means rotatably mounted on said frame of said movable rig so as to be in operational relationship with said pipe rack arms to load and unload said elongated well elements from said pipe rack arms;

(b) conveying means mounted on said frame of said movable rig for conveying individual well elements from said horizontal storing means to a transfer location;

(c) transfer means mounted on said frame of said movable rig including means for holding said individual well elements

and means for rotating said well elements to a vertical position parallel to the center line of said well;

(d) manipulating means mounted on said frame of said movable rig including means for grasping said well element from said transfer means and moving said well element in a horizontal direction to position the longitudinal axis of said well element in alignment with the center line of said well;

(e) means, mounted on said frame of said movable rig, for moving said well element along said longitudinal axis thereof into operative position with respect to said well;

(f) power rotating coupling means mounted on said frame of said movable rig for coupling said well element to other well elements located in said well;

(g) and control means for sequencing the operation of said conveying means, said transfer means, said manipulating means, said means for moving, and said power rotating coupling means to accomplish said handling of said well elements into and out of said operating relationship with said well totally automatically;

wherein the means of (a) through (e) above are adapted to be placed in operative position when said rig is positioned for operation with respect to a well, and said means of (a) through (e) are stored on said rig when said rig is being moved from place to place.

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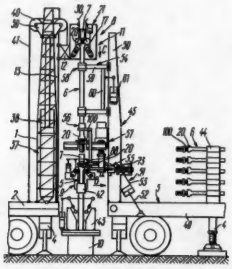
**4,591,007**

## WELL TUBING HANDLING APPARATUS

**Albert S. Shaginian; Anatoly A. Pevnev; Alexei G. Asan-Dzhalalov; Alexandr P. Androsenko; Leonid N. Palkin, and Elena I. Klimovich, all of Gomel, U.S.S.R., assignors to Spetsialnoe Konstruktorskoe Bjuro Seismicheskoi Tekhniki, Gomel, U.S.S.R.**

**Filed Feb. 22, 1983, Ser. No. 468,485**
**Int. Cl.[4] E21B** *19/15, 19/16*
**U.S. Cl. 175—85** **1 Claim**



1. An apparatus for handling elongated well elements, such as well rods, made up in a well string by means of screw joints, said apparatus comprising:

a mast arranged at a well bore and having longitudinal guides,

upper means for suspending a well string of elongated well elements, said upper means being movably mounted on said mast,

centering guide means for centering the upper end of an elongated well element, said centering guide means being movably mounted on the longitudinal guides of said mast,

hoisting means kinematically connected to said upper means for suspending a well string of elongated well elements,

lower means for suspending a well string of elongated well elements, said lower means being immovably mounted above a well head,

storing means for storing elongated well elements arranged beside the well head,

a manipulator for moving an elongated well element between said storing means and said upper means, said manipulator including

a base member arranged adjacent the well head,

a boom mounted on said base member for rotation between a position of moving an elongated well element off said storing means and an operating position where the elongated well element is aligned with the well bore,

a rotary drive mounted on said base member and kinematically connected to said boom,

clamp means for holding an elongated well element as said elongated well element is transferred by said manipulator from said storing means to said operating position, said clamp means being mounted on said boom and having coaxial grippers spaced along said boom,

gripping means for gripping the upper end of a string of elongated well elements, said gripping means being mounted on said boom for lateral elastic displacement so that with said boom in said operating position said gripping means is disposed between said clamp means and said lower means, said gripping means having at least one pair of power-driven gripping jaws arranged so as to define an opening in their closed position, said opening being substantially coaxial with the coaxial grippers of said clamp means,

means for gripping and centering the lower end of an elongated well element, said means for gripping and centering being mounted on said boom for lateral elastic displacement between said clamp means and said gripping means and having at least one pair of power-driven centering jaws, said means for gripping and centering being mechanically coupled to said gripping means so that openings defined by the jaws of said gripping means and said means for gripping and centering, on closing, are coaxial, and

a swivel head for screwing and unscrewing a string of elongated well elements, said swivel head being mounted on said boom for longitudinal elastic displacement with respect to the gripping means.

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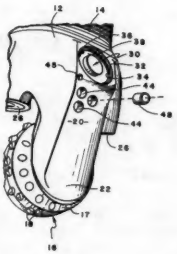
**4,591,008**

## LUBE RESERVOIR PROTECTION FOR ROCK BITS

**Michael S. Oliver, Lafayette, La., assignor to Smith International, Inc., Newport Beach, Calif.**

**Filed Aug. 22, 1984, Ser. No. 643,220**
**Int. Cl.[4] E21B** *9/10, 10/22, 10/14*
**U.S. Cl. 175—227** **3 Claims**



1. An apparatus to protect the lubrication system for a sealed bearing rotary cone rock bit which comprises:

a rock bit body having a first pin end and a second cutting end, one or more legs extend from said rock bit body, each leg having a journal bearing nearest said second cutting end, each of said journal bearings having a rotary cutter cone attached thereto,

a lubricant reservoir chamber is formed by at least one leg of said rock bit body, the reservoir chamber includes a reservoir cover cap that is retained within an opening to said

reservoir chamber formed by the leg of the rock bit, said cover cap is retained within said reservoir opening by a snap ring, said snap ring is retained within a groove formed in said leg adjacent said opening to said reservoir chamber, and

means to protect the cover cap for said reservoir chamber to prevent the cover cap from becoming disengaged from the lubricant reservoir chamber in the leg of the rock bit during rock bit drilling operations, said means to protect said cover cap is an application of hardfacing material positioned around the peripheral edge of said opening to said reservoir chamber.

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**4,591,009**

## DRILL SOUNDPROOFING DEVICE

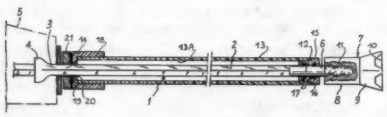
**Frédéric E. Marcel, Verneuil.En.Halatte, and Francois J. M. Maume, Pont-Ste-Maxence, both of France, assignors to Charbonnages de France, Paris, France**

**Filed Oct. 19, 1984, Ser. No. 662,629**

**Claims priority, application France, Oct. 24, 1983, 83 16879**

**Int. Cl.[4] E21C *7/00*; E21B *17/00***

**U.S. Cl. 175—320** **5 Claims**



1. A sound proofing device for a drill of the type which has an elongate shaft extending between a bit and a forged collar for attachment to a hammer, the device comprising a sheath of semi-rigid plastics material surrounding said shaft without touching same, said material being bendable in the same manner as the drill when drilling is in progress, and acoustically insulated material lining the inside surface of said sheath and disposed so as to be spaced from said elongate shaft, sealed first mounting means disposed near said bit and second mounting means disposed near said hammer, said sheath with its lining extending between said first and second mounting means, said first and second mounting means being free to move relative to said shaft in rotation and translation, said first mounting means comprising a ring at least part of which is inserted inside said sheath and having a cylindrically shaped inside surface and at least one sealing member disposed between said cylindrical inside surface and a cylindrical surface of said shaft.

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**4,591,010**

## COUPLING BETWEEN A DRILL BIT AND A DRILL SHAFT

**Jan E. Persson, S-131, 32 Nacka, Sweden**

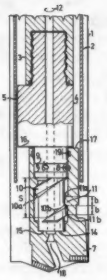
**Filed Oct. 4, 1985, Ser. No. 784,353**

**Claims priority, application Sweden, Oct. 10, 1984, 8405053**

**Int. Cl.[4] E21B *17/04***

**U.S. Cl. 175—320** **10 Claims**

1. Coupling for obtaining in two end positions located in angular distance from each other a rigid torque connection in one rotation direction between a drill shaft (**6**) and a drill bit (**7**) being in opposite direction freely rotatable on the drill shaft (**6**) between said end positions, whereby the drill shaft (**6**) comprises a first abutting means, in the first end position being engaged in a first stop means arranged on the drill bit (**7**), and a second abutting means, in the second end position being engaged in a second stop means arranged on the drill bit (**7**), characterized in that the first abutting means of the drill shaft (**6**) comprises a helical first abutting surface (**10***b*) arranged at the circumference, that the first stop means of the drill bit (**7**) comprises a helical first stop surface (**11***b*) arranged on the interior surface and parallel to the first abutting surface (**10***b*) of the shaft (**6**), which stop surface in the first end position is engaged in the first abutting surface (**10***b*) of the shaft (**6**), and that limiting means (**8, 9; 14, 15; 16, 17**) are arranged on the drill bit (**7**) and the drill shaft (**6**) to delimit in both shaft directions the axial range of movement of the drill bit (**7**) along the drill shaft (**6**).



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**4,591,011**

## BALANCE WITH CLOCK-LIKE DISPLAY

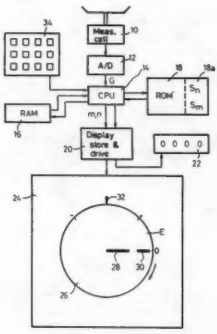
**Arthur Baumann, Bertschikon, Switzerland, assignor to Mettler Instrumente AG, Greifensee-Zurich, Switzerland**

**Filed Jan. 9, 1984, Ser. No. 569,173**

**Claims priority, application Switzerland, Jun. 10, 1983, 3196/83**

**Int. Cl.[4] G01G *13/02, 23/14***

**U.S. Cl. 177—122** **20 Claims**



1. Apparatus for furnishing a visual display of the weight of a substance being metered to a desired weight value in a metering cycle having a coarse and a fine metering phase, comprising, in combination,

first means for receiving said metered substance at a changeable rate of weight addition;

second means for creating a visual display in response to signals applied thereto; and

third means interconnected between said first and said second means for applying signals creating a clock-like display to said second means, said clock-like display having a periphery, a central region, and single indicator means extending from said central region toward said periphery, said indicator means rotating at a first rotational speed during said coarse metering phase, and at a second speed higher than said first rotational speed during said fine metering phase relative to said rate of weight addition during said metering cycle, and

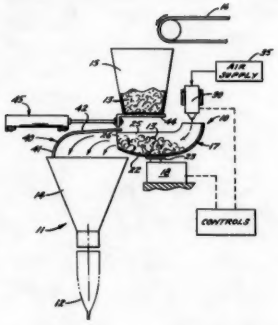
means for changing said first rotational speed to said second rotational speed at a selectable percentage of said desired weight value.

4,591,012

## WEIGHING APPARATUS WITH IMPROVED WEIGHING BUCKET

Michael J. Moran, Raleigh, and Joseph B. Lohr, Chapel Hill, both of N.C., assignors to USM Corporation, Farmington, Conn.

Filed Feb. 19, 1985, Ser. No. 702,891
Int. Cl.[4] G01G *19/52, 21/22*
U.S. Cl. 177—145 7 Claims




1. Weighing apparatus comprising a container for holding product to be weighed, means for intermittently delivering batches of product to said container, means associated with said container for producing a signal representative of the weight of each batch of product in the container, and means for receiving each batch of product from said container after the product has been weighed, the improvement in said weighing apparatus comprising, pneumatic means for intermittently directing a flow of air into said container and against the batch of product therein to eject such product from said container and into said receiving means.

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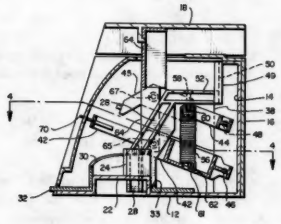
4,591,013

## MULTI-RANGE WEIGHT SCALE

J. Hunter Giltzow, Roseland, N.J., assignor to Ketcham & McDougall, Inc., Roseland, N.J.

Filed Dec. 6, 1984, Ser. No. 678,746
Int. Cl.[4] G01G *23/14, 23/26*
U.S. Cl. 177—230 4 Claims



1. A multi-range weight scale which comprises:
a bottom base plate,
a cam supported by said bottom plate, and
weight determining means secured relative to said cam, said cam adjusting said weight determining means to zero scale in an initial weight capacity, for tare weight application permitting a preload up to an initial weight capacity and rezero scale to weigh articles up to twice the initial capacity including preload weight, to preload the scale with an initial weight capacity to weigh articles having weight up to double the initial weight capacity and from a first weight range having the same resolution to a second weight range which is exactly double that of said first weight range with the same resolution.

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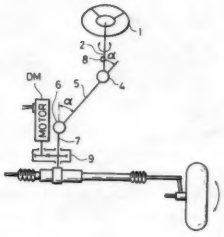
4,591,014

## ELECTRIC POWER STEERING EQUIPMENT

Tomio Yasuda, Kasugabe, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Filed Apr. 13, 1984, Ser. No. 600,052
Claims priority, application Japan, Sep. 22, 1983, 58-175695
Int. Cl.[4] B62D *5/04*
U.S. Cl. 180—79.1 15 Claims




1. An electric power steering apparatus comprising:
an electric motor;
a manual steering torque transmission mechanism for transmitting torque of a steering wheel to a steering gear through a plurality of steering shafts coupled to one another by a plurality of coupling means for coupling said steering shafts, one of said coupling means being nearest to said steering gear;
a motor torque transmission mechanism interposed between said steering gear and said coupling means nearest to said steering gear, and said motor torque transmission mechanism coupled to said electric motor;
a manual steering torque detecting means for detecting the manual steering torque applied to at least one of said steering shafts of said manual steering torque transmission mechanism;
load current detecting means for detecting a load current flowing through said electric motor;
control means for providing an input to said electric motor based on the output signals from said steering torque detecting means and said load current detecting means, said control means supplying a load current in accordance with the detected steering torque and the detected load current, said control means limiting the maximum value of the load current not to exceed a predetermined value and said control means limiting the maximum value of the output signal level from said steering torque detecting means to a predetermined level.

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4,591,015

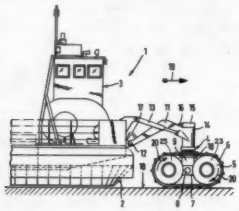
## WHEEL PROPULSION DEVICE FOR AIR CUSHION VEHICLE

Seppo Korppoo, Espoo, and Martin Landtman, Helsinki, both of Finland, assignors to Oy Wärtsilä AB, Helsinki, Finland

Filed Oct. 12, 1983, Ser. No. 540,989
Claims priority, application Finland, Oct. 19, 1982, 823576
Int. Cl.[4] B60V *1/14*
U.S. Cl. 180—119 13 Claims

1. A self-propelled air cushion vehicle comprising a rigid body structure having a front end and a rear end and defining a longitudinal axis of the vehicle, a flexible skirt attached to the body structure and enclosing a space to contain an air cushion for at least partially supporting the rigid body structure, two traction wheel units, and first and second universal joints con-

necting the traction wheel units respectively to the rigid body structure outside said flexible skirt, one traction wheel unit being in front of the front end of the rigid body structure and the other behind the rear end thereof, at positions in the region of said longitudinal axis, each of said wheel units comprising at least two consecutive wheels and at least one common,



ground-engaging caterpillar track surrounding said wheels, and the vehicle further comprising drive means connected to the traction wheel units for driving the caterpillar tracks to propel the vehicle, and steering means for varying the angular position of at least one of said wheel units relative to said longitudinal axis.

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**4,591,016**

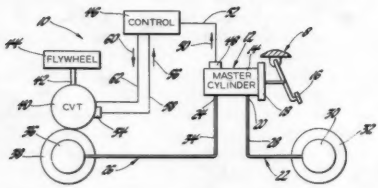
## BRAKE SYSTEM IN A VEHICLE HYBRID DRIVE ARRANGEMENT

**Charles C. Matthews, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Mar. 19, 1984, Ser. No. 590,779**

**Int. Cl.[4] B60K *9/04***

**U.S. Cl. 180—165** **15 Claims**




1. In a vehicle brake system having front and rear hydraulic brake circuits and front wheel brakes and rear wheel brakes actuatable by hydraulic brake actuating pressures respectively in said front and rear hydraulic brake circuits, means including a master cylinder for generating hydraulic brake actuating pressures, and a brake actuator movable to actuate said master cylinder; a combined service brake and regenerating braking system comprising:

said front wheel brakes when activated selectively driving an energy storage and releasing means through a continuously variable transmission;

means generating information signals including at least one information signal indicating at least one operational condition in said vehicle brake system and another information signal from said continuously variable transmission indicating an operational condition of said continuously variable transmission;

and control means receiving said at least one information signal and said another information signal and generating one or more control signals, one such control signal controlling said continuously variable transmission in accordance with said information signals received by said control means to control regenerative braking of said front wheel brakes and storage of front wheel braking energy in said energy storage means.

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**4,591,017**

## BICYCLE WITH AN AUXILIARY ENGINE

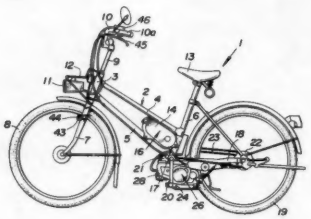
**Sadamichi Enjo; Yasuhiko Tsukiji; Goroei Wakatsuki, all of Saitama, and Toushi Noguchi, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 10, 1985, Ser. No. 690,239**

**Claims priority, application Japan, Jan. 11, 1984, 59-3114**

**Int. Cl.[4] B62K *11/04***

**U.S. Cl. 180—205** **13 Claims**



1. A bicycle comprising:

(a) an engine;

(b) a wheel;

(c) clutch means for enabling and disabling the transmission of power between said engine and said wheel;

(d) a clutch control member operatively connected to said clutch means and having a first position for disconnecting said clutch means to disable power transmission and a second position for connecting said clutch means to enable power transmission;

(e) a throttle control member for controlling a throttle valve of said engine;

(f) switching means interconnecting said clutch control member with said throttle control member for releasing said clutch control member for movement from said first position to said second position when said throttle control member is operated; and

(g) an electrical engine starting circuit including means closable and openable in response to connection and disconnection of said clutch means for making said engine operative when said clutch means is connected and inoperative when said clutch means is disconnected, whereby said clutch means can be connected in response to operation of said throttle control member, said engine can be started while said clutch means is connected, and said engine can be rendered inoperative in response to operation of said clutch control member from said second position to said first position.

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**4,591,018**

## TRACTOR

**Cornelis van der Lely, 7 Brüschenrain, Zug, Switzerland**

**Filed Aug. 30, 1983, Ser. No. 527,828**

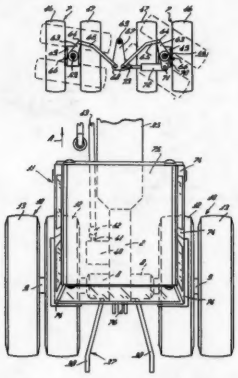
**Claims priority, application Netherlands, Aug. 31, 1982, 8203381**

**Int. Cl.[4] B62D *5/10*; B60K *17/30***

**U.S. Cl. 180—260** **14 Claims**

1. A tractor comprising wheels which are mounted on king pins having longitudinal centerlines which define a plane, a divided track rod connected to said king pins on one side of said plane for steering said wheels, said track rod comprising two parts, each said part intersecting in its middle part, if the wheels are aligned for straight forward travel said plane extending between and containing said king pins' longitudinal center lines, and a hydraulic cylinder and piston assembly having one end pivotally connected near one end of a first of

said track rod parts and its other end connected to a king pin, both said latter connections being on the opposite side of said



plane from the connection of said king pin and said first track rod part whereby said wheels are hydraulically steerable.

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**4,591,019**

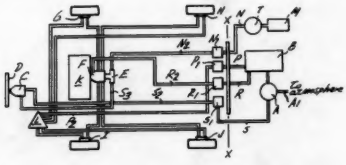
## DETECTOR RESPONSIVE FLUID ACTUATED AUXILIARY BRAKING SYSTEM

**Brian Fisher, 34 St. Giles Way, and Raymond R. Westmoreland, 11 St. Giles Way, both of Cropwell Bishop, Nottinghamshire, England**

**Continuation of Ser. No. 556,059, Nov. 29, 1983, abandoned, which is a continuation-in-part of Ser. No. 314,783, Oct. 26, 1981, abandoned, which is a continuation-in-part of Ser. No. 59,287, Jul. 20, 1979, abandoned. This application Jul. 15, 1985, Ser. No. 755,227**

**Int. Cl.[4] B60T *7/16***

**U.S. Cl. 180—275** **3 Claims**



1. A main air brake system for a mobile vehicle having a drive selector having reverse and other positions, a plurality of compressed-air tanks, main conduit means including a first foot-brake line and a second hand-brake line for connecting at least one of said tanks to wheel-brake chambers, and air control valves connected in said conduit means for controlling air pressure at the wheel-brake chambers, said main air brake system having associated therewith an auxiliary air brake system which includes:

(a) a first additional air control valve controlled by said drive selector;

(b) a detector member mounted at the rear of said vehicle, said detector member having a normal condition and positioned to be actuated to an actuated condition by contact with an external object during reverse movement of said vehicle;

(c) a second additional non-electrically actuated air control valve actuable in response to actuation of said detector member;

(d) additional conduit means so connecting said first and second additional air control valves as to control the pressure at said wheel-brake chambers when said detector member is in its actuated condition and said drive selector is in reverse position; and

(e) a vent to atmosphere positioned and adapted to vent air from said additional conduit means when said drive selector is in a selected position other than reverse, and adapted to prevent venting air from said additional conduit means when said drive selector is in reverse position, thereby to maintain said pressure at said wheel-brake chambers when said detector member is returned to its normal condition and said drive selector is in reverse position.

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**4,591,020**

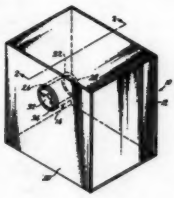
## LOUDSPEAKER ENCLOSURE WITH ISOLATION OF LOUDSPEAKER VIBRATION

**John O. Hruby, Jr., 1240 Alta Paseo, Burbank, Calif. 91501**

**Continuation of Ser. No. 608,888, May 10, 1984, which is a continuation of Ser. No. 118,596, Feb. 4, 1980, Pat. No. 4,509,615. This application Jun. 12, 1985, Ser. No. 744,287**

**Int. Cl.[4] H05K *5/00***

**U.S. Cl. 181—145** **23 Claims**



1. A loudspeaker enclosure comprising a primary chamber having a principal interior volume and a secondary chamber having a minor interior volume substantially smaller than the principal interior volume, the primary chamber having a front wall, the secondary chamber comprising an elongated housing sealed to the primary chamber, the secondary chamber housing having a speaker mounting opening exterior of the primary chamber and an interior opening that opens directly from the interior of the secondary chamber into the interior of the primary chamber, the secondary chamber having an outer wall defining a speaker mounting opening and which is defined, configured and arranged relative to the wall of the primary chamber housing to inhibit the transmission of vibrations induced in a loudspeaker mounted in the speaker mounting opening, the speaker mounting opening being open essentially directly from the interior of the secondary chamber to the exterior of the enclosure.

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**4,591,021**

## SKY-SLIDE EMERGENCY ESCAPE SYSTEM

**Hyok S. Lew, 7890 Oak St., Arvada, Colo. 80005, and Mike Stranahan, 2858 Woody Creek Rd., Woody Creek, Colo. 81656**

**Continuation-in-part of Ser. No. 562,839, Dec. 19, 1983. This application Sep. 4, 1984, Ser. No. 647,364**

**Int. Cl.[4] A62B *1/00***

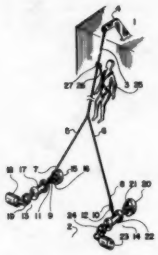
**U.S. Cl. 182—10** **21 Claims**

1. The sky-slide system for rapidly lowering a person or an

object from an elevated structure to a lower level comprising in combination;

(a) a guide cord with one extremity secured to an elevated structure and the other extremity smoothly and securely connected to at least two braking cords respectively branching off from said other extremity of said guide cord whrein each of said braking cords reaches down to a lower level;

(b) a plurality of cord take-up means permanently or temporarily disposed immovably at a lower level away from each other and away from a vertical line including said one extremity of said guide cord secured to said elevated structure wherein each of said cord take-up means taking up each of said braking cords reaching down to a lower level includes a first means for taking up and tensing each of said braking cords and a second means for continuously releasing each of said braking cords at a controlled rate



maintaining a controlled tension on each of said braking cords when said braking cords are pulled by a descending person or an object descending on said sky-slide system; and

(c) a harness safely securing a descending person or an object on said sky-slide system, said harness depending from a ring including means for opening and closing said ring whereby said ring can be clasped on said guide cord;

whereby a person or an object wearing said harness to be lowered from said elevated structure clasps said ring supporting said harness onto said guide cord and jumps off from said elevated structure whereupon said descending person or object is first accelerated downward during a descent following said guide cord and then, decelerated gradually to a safe landing on a lower level by said braking cords being released from said cord take-up means at a controlled rate maintaining a controlled tension on said braking cords.

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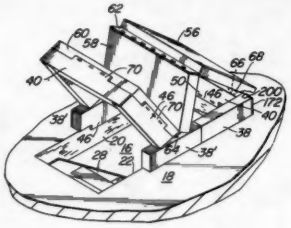
**4,591,022**

## INSULATING ENCLOSURE FOR A CEILING OPENING

**Orlando L. Sciambi, 22 Terrace Rd., Norristown, Pa. 19401, and Frank J. Valtri, Box 1222, Warminster, Pa. 18974**

**Filed Dec. 4, 1984, Ser. No. 677,726**
**Int. Cl.[4] E06B *5/18***
**U.S. Cl. 182—47** **16 Claims**

1. An insulating enclosure for a ceiling opening of the kind associated with a pull-down folding stair, comprising a wall portion and a top-forming portion, said top-forming portion being selectively movable between an operative disposition and a retracted disposition in which access may be had through the opening, said wall portion comprising a first wall portion fixedly positioned adjacent to the opening, said top-forming member being hingedly interconnected with said first wall portion and adapted to overlie said first wall portion when operatively disposed, and a second wall portion affixed to said top-forming member for movement therewith, said second wall portion forming, when said top-forming member is operatively disposed, a continuation of said first wall portion, whereby said first and second wall portions form, when said top-forming member is operatively disposed, a substantially continuous raised wall around the periphery of the opening



with said top-forming member overlying said raised wall to complete said enclosure.

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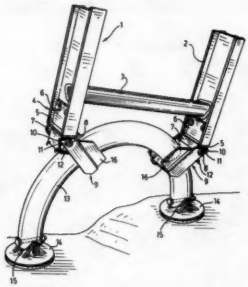
**4,591,023**

## LEVELLING DEVICE FOR LADDERS

**Baden L. Hodson, 29 Stirling Street, Enoggera, Queensland 4051, Australia**

**Filed May 10, 1985, Ser. No. 732,731**
**Claims priority, application Canada, Nov. 23, 1984, 468507**
**Int. Cl.[4] E06C *7/44***
**U.S. Cl. 182—200** **7 Claims**



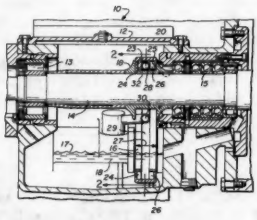
1. A ladder levelling device comprising an arcuate support bar terminating in ground-engaging feet, and means for attaching the support bar to the side poles of a ladder to be supported, said attaching means including, for each side pole, a mounting bracket for attachment to the bottom end of the respective side pole and an apertured lug through which the support bar passes in sliding engagement therewith, the lug being pivotally connected to the bracket for pivotal movement in the plane of the ladder whereby it is adapted to grip the support bar and lock it to the side pole at any position at which it is set when the weight of the ladder is applied to the support bar through said attaching means, wherein each lug is formed with an extension member having an abutment surface extending parallel to the plane of the ladder, said extension member being movable in accordance with the pivotal movement of the lug to bring the abutment surface into tangential engagement with the support bar to prevent tilting of the ladder relative to the support bar when the lug is moved to the locking position.

4,591,024

## LUBE OIL RING PUMP

John W. Erickson, Huntington Beach, Calif., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Mar. 19, 1984, Ser. No. 591,210
Int. Cl.[4] F01M *9/06*
U.S. Cl. 184—11.2 43 Claims



1. A lubrication system for moveable machine parts within a housing having a sump containing a fluid and a rotatable shaft comprising:

a. a ring eccentrically encircling and being frictionally rotated by said shaft, said ring being at least partially immersed in said sump fluid to carry said fluid for said machine parts during rotation, and

b. first and second abutments attached to said shaft, one on each side of said ring and spaced from said ring sufficiently to form an axial gap for a fluid film which transmits rotational power from said abutments to said ring.

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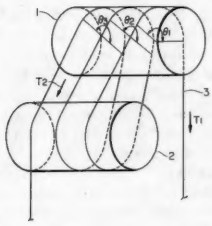
4,591,025

## TRACTION TYPE ELEVATOR SYSTEM

Takenobu Honda, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 19, 1984, Ser. No. 652,184
Claims priority, application Japan, Sep. 21, 1983, 58-174856; Dec. 16, 1983, 58-237345; Dec. 26, 1983, 58-203094[U]
Int. Cl.[4] B66B *11/08*
U.S. Cl. 187—20 8 Claims



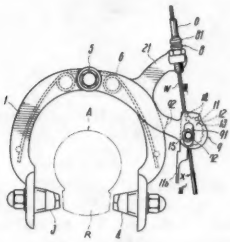
3. In a traction type elevator system wherein a cage and a balance weight are respectively suspended from either end of a main rope which is wound around a driving sheave and a delector wheel, said main rope being wound around said sheave and said deflector wheel by at least three turns; means in an outer peripheral surface of said sheave with which said main rope is held in engagement forming grooves for said main rope in the shape of circular arcs in section, said grooves around which said main rope is wound first and last being higher in hardness than the other grooves.

4,591,026

## CALIPER BRAKE HAVING POSITION MAINTENANCE MEANS

Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Dec. 1, 1983, Ser. No. 556,997
Claims priority, application Japan, Dec. 8, 1982, 57-186481[U]
Int. Cl.[4] B62L *1/12*
U.S. Cl. 188—2 D 3 Claims



1. A caliper brake comprising a pair of brake arms each having a brake shoe; spring means which biases said brake arms in a direction of moving said brake shoes away from each other; operating means comprising a control wire for swinging said brake arms against a bias of said spring means; an outer sheath for guiding said wire; a receiving member having a receiving portion for retaining said operating means and a shaft member extending to one side with respect to said receiving portion; a support member which supports said shaft member at said receiving member to be displaceable in a same direction as a moving direction of said wire when said wire is operated; an operating member supported rotatably to said shaft member; and maintaining means provided between said support member and said operating member, for setting and maintaining a position of said receiving member with respect to said support member, said maintaining means comprising a cam face having a plurality of recesses and an engaging portion which is opposite to said cam face, said engaging portion engaging with at least one of said recesses, said recesses being adapted to be biased to engage with said engaging portion by said spring means, said at least one of said recesses engaging with said engaging portion of said maintaining means at a position which is displaced with respect to a pulling direction of said control wire such that said opening member is subjected to a moment of rotation by a pulling force acting on said wire.

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4,591,027

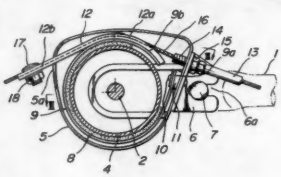
## BAND BRAKE ASSEMBLY FOR BICYCLE

Kikuzo Takamiya, Kitamoto, and Yoshitaka Tamura, Saitama, both of Japan, assignors to Bridgestone Cycle Co., Ltd., Tokyo, Japan

Filed Nov. 25, 1983, Ser. No. 555,086
Claims priority, application Japan, Dec. 2, 1982, 57-210561
Int. Cl.[4] F16D *49/10*
U.S. Cl. 188—24.11 4 Claims

1. A band brake assembly for a bicycle including a brake band having an inner brake lining for urging against a brake drum by a brake operating force acting on a brake operating cable during braking, said assembly comprising: a wire guide consisting of a front half a rear half, and an outer surface extending across said front and rear halves, said front half being in the form of an arc and fixed to an outer surface of an operative end of said brake band, said rear half extending in a tangential direction of said brake band; and an inner wire of said brake operating cable extending rearward the an outer surface of said wire guide such that said front half of said wire guide is located between said inner wire and said brake band

and lining in an overlapping relationship, said inner wire being fixed to a rear end of said wire guide to subject said wire guide to a compressive force when a tensile force is applied to said



inner wire, brake band and lining during braking, so that the overlapped wire guide, inner wire, brake band and lining are slightly shifted relative to each other to damp vibration.

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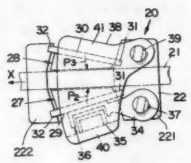
**4,591,028**

## DISC BRAKE HAVING OPPOSITELY SWINGABLE CYLINDER AND CALIPER

**Yutaca Hagiwara, Kamakura; Terukiyo Kitamura, Tokyo, and Hideto Murakami, Hatano, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Nov. 7, 1984, Ser. No. 669,009**
**Claims priority, application Japan, Nov. 16, 1983, 58-215603**
**Int. Cl.[4] F16D** *55/14, 55/46, 65/20*
**U.S. Cl. 188—72.2** **26 Claims**



1. A disc brake for a vehicle, comprising:

a disc adapted to rotate together with a vehicle wheel,

a first pad assembly comprising a first pad attached to a first backing plate and a second pad assembly comprising a second pad attached to a second backing plate, said first and second pad assemblies being disposed on opposite sides of said disc so that said first and second pads face each other and said disc rotates between said first and second pads, each of said first and second pad assemblies having a leading portion and a trailing portion which are so located that said disc rotates between said first and second pads from said leading portion to said trailing portion when the vehicle moves forwards, and

nonrotational support means supporting said first and second pad assemblies and having a brake cylinder actuator placed behind said first pad assembly for loading said first pad assembly against said disc directly, said nonrotational support means comprising

a stationary support member adapted to be fixed to a vehicle body,

a swingable yoke supported on said stationary support member so that said yoke can swing about a yoke pivot axis substantially parallel to said disc, said yoke straddling said disc and having a first leg lying at such a position that said cylinder actuator is placed between said first pad assembly and said first leg, and a second leg lying behind said second pad assembly for loading said second pad assembly against said disc when said yoke swings about said yoke pivot axis in a yoke swing direction by being pushed at said first leg by said cylinder actuator, said second leg having a leading portion for loading said leading portion of said second pad assembly against said disc and a trailing portion for loading said trailing portion of said second pad assembly against said disc, said trailing portion of said second leg being more remote from said yoke pivot axis than said leading portion of said second leg, and

a swingable cylinder member having said brake cylinder actuator, said cylinder member being swingably supported on said stationary support member so that said brake cylinder actuator can swing about a cylinder pivot axis substantially parallel to said disc, said brake cylinder actuator swinging about said cylinder pivot axis in a cylinder swing direction opposite to said yoke swing direction when said brake cylinder actuator is actuated to load said first pad assembly against said disc and push said first leg to swing said yoke in said yoke swing direction.

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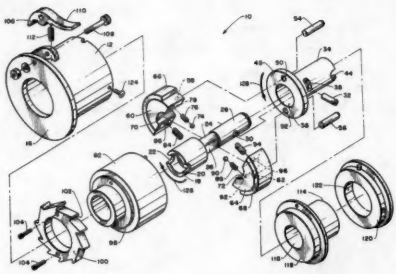
**4,591,029**

## LOAD ACTUATING BRAKING APPARATUS

**John P. Da Foe, 1817 North "C" St., Oxnard, Calif. 93030**

**Filed Aug. 17, 1984, Ser. No. 641,734**
**Int. Cl.[4] B60T** *7/12*
**U.S. Cl. 188—134** **3 Claims**



1. A load actuating braking apparatus comprising:

an output shaft, said output shaft being under continuous torque tending to rotate said output shaft in a counterclockwise direction;

an input shaft, said output shaft being connected by connection means to said input shaft, clockwise rotation of said input shaft causes clockwise rotation of said output shaft;

a movable housing located about said output shaft and said input shaft;

a brake assembly located about said output shaft, said brake assembly having a brake pad assembly, said brake pad assembly being movable between a total braking position and a partial braking position, said brake pad assembly being located in tight contact with said movable housing when in said total braking position which is when said input shaft is rotated clockwise and when no input torque is being applied to said input shaft;

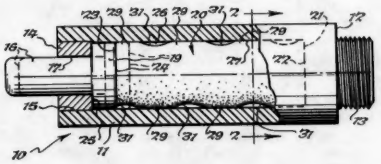
an actuation mechanism connected between said output and input shafts and said brake pad assembly, rotation of said input shaft counterclockwise causes said actuation mechanism to move said brake pad assembly to said partial braking position, whereby said brake pad assembly rotates counterclockwise relative to said movable housing and said output shaft also rotates counterclockwise; and

said connection means comprising a pin being fixedly mounted to said output shaft, said output shaft being mounted within said input shaft in a close conforming manner, an elongated slot being formed within said input shaft, said pin being locatable within said elongated slot, relative movement between said output shaft and said input shaft being limited by the length of said elongated slot.

## 4,591,030
## ELASTOMERIC DAMPED SHOCK ABSORBER

**Robert G. Antkowiak, Pendleton, N.Y., assignor to Tayco Developments, Inc., North Tonawanda, N.Y.**

**Filed Apr. 16, 1984, Ser. No. 600,790**
**Int. Cl.[4] F16F *9/30, 1/36***
**U.S. Cl. 188—268** **13 Claims**



1. A shock absorber comprising a casing with wall means defining a chamber having a first volume and an axis with said first volume being completely open and unobstructed within the confines of said wall means, elongated elastomeric means of substantially solid cross sectional configuration in said chamber extending lengthwise of said axis and having first and second ends, said elongated elastomeric means being of a second volume which is less than said first volume, said elongated elastomeric means being of undulating shape with first substantial spaced portions extending lengthwise of said axis for frictional engagement with said wall means and with second substantial spaced portions extending lengthwise of said axis located between said first substantial spaced portions and located in spaced relationship to said wall means, piston means in said chamber proximate said first end, a piston rod forming an extension of said piston means and including a portion located externally of said chamber for receiving an external force for transmittal to said piston, holding means in said chamber proximate said second end for holding said second end against movement out of said chamber under all conditions of operation of said shock absorber, and mounting means for mounting said piston rod for moving said piston means into said chamber to move said first end of said elongated elastomeric means toward said second end thereof to thereby tend to compress said elongated elastomeric means in addition to effecting distortion thereof and thus cause said first substantial spaced portions to provide substantial frictional rubbing engagement with said wall means as they are caused to travel lengthwise of said axis as said elongated elastomeric means is distorted by said piston means, said elongated elastomeric means returning to the condition it occupied before said piston moved into said casing when said external force is removed from said piston rod.

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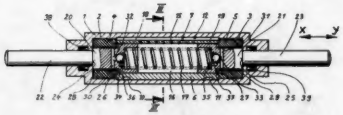
## 4,591,031
## HYDRAULIC SHOCK ABSORBER WITH TWO-WAY ACTION

**Karl O. R. Kirst, Langenfeld, Fed. Rep. of Germany, assignor to Ace Controls, Inc., Farmington, Mich.**

**Filed Jun. 22, 1984, Ser. No. 623,418**
**Claims priority, application Fed. Rep. of Germany, Jul. 5, 1983, 3324165**
**Int. Cl.[4] F16F *9/48***
**U.S. Cl. 188—287** **8 Claims**



1. A hydraulic shock absorber with two-way action, with a pressure tube arranged in a housing and at least partially filled with hydraulic oil, and with a plurality of throttle openings which are distributed over the length of the pressure tube and connected on one hand to a pressure space of the pressure tube and on the ot..er hand to cavities (12, 13, 14) radial gaps (28, 19) and axial gaps (26, 27) of the housing, with piston rod seals (38, 39) at the ends, characterized in that:

(a) a pair of pistons (18, 19), each provided with a solid piston rod, (22, 23) are associated with the common pressure space (16) of the pressure tube (6);

(b) the piston rod seals (38, 39) are at least nearly completely relieved of the pressure of pressure medium;

(c) a compression return spring is mounted in said pressure space, between said pistons, and the ends thereof are seated against the respective adjacent piston;

(d) each of said pistons has a channel means extended therethrough for connecting the respective adjacent radial cap at its end of the pressure tube with the pressure space (16) in the pressure tube; and;

(e) each of the pistons has a check valve mounted in the channel means therein for normally closing off flow of hydraulic oil through said channel means during a shock absorbing movement of a piston inward of the pressure tube, and for allowing flow of hydraulic oil through said channel means from said cavities and gaps and back to said pressure space in the pressure tube during a retroactive outward movement of a piston in the pressure tube.

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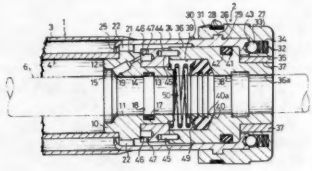
## 4,591,032
## PRESSURE REGULATOR MECHANISM FOR HYDRAULIC DEVICES

**Fumio Itazu, 436, Shimokobi, Kobi-Cho, Minokamo-shi, Gifuken, Japan**

**Filed Jul. 24, 1984, Ser. No. 633,789**
**Claims priority, application Japan, Mar. 22, 1984, 59-55660**
**Int. Cl.[4] F16F *9/34***
**U.S. Cl. 188—313** **7 Claims**



1. A pressure regulator mechanism for use in a hydraulic device having a cylinder and a piston slidably movable therein, comprising:

(a) a casing housing said cylinder therein;

(b) first restriction means on said cylinder for forming a portion of a passage of working oil between said cylinder and said casing, said first restriction means comprising a single annular restriction groove defined in a cylinder cap on the end of said cylinder; said annular restriction groove having closed ends and a continuously varying cross-sectional area;

(c) a valve member angularly movable around an axis of movement of said piston for closing said first restriction means; and

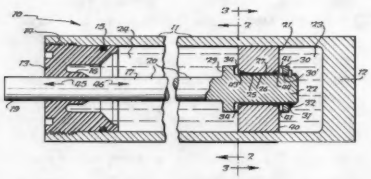
(d) second restriction means on said valve member for forming a remaining portion of said passage when brought into confronting relation to said first restriction means in response to angular movement of said valve member, said second restriction means comprising a single restriction hole defined in said valve member.

4,591,033

## SHOCK ABSORBER WITH FLUID AMPLIFIED FLOW AT CENTRAL PORTION OF PISTON HEAD

Douglas P. Taylor, North Tonawanda, N.Y., assignor to Tayco Developments, Inc., North Tonawanda, N.Y.

Filed Jan. 25, 1984, Ser. No. 573,574
Int. Cl.[4] F16F 9/36
U.S. Cl. 188—317 12 Claims



1. A shock absorber comprising a casing, a piston rod having a first portion within said casing and a second portion outside of said casing, an end wall in said casing for mounting said piston rod for movement into and out of said casing, a piston head, first and second chambers on opposite sides of said piston head, compressible fluid in said first and second chambers, a bore centrally located in said piston head, first peripheral portion means on said piston head surrounding said bore for mounting said piston head on said first portion of said piston rod, groove means between said first portion of said piston rod and said piston head, and second outwardly flaring peripheral portion means on said piston head surrounding said bore and at opposite ends of said first peripheral portion means and of larger diameter than said first peripheral portion means and forming a continuation thereof for forming a fluid amplification orifice in combination with said first peripheral portion means and said first portion of said shaft and said groove means for passing said compressible fluid between said first and second chambers in both directions of movement of said piston rod.

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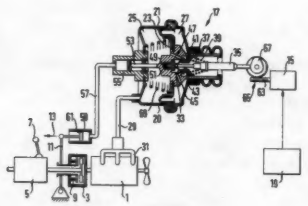
4,591,034

## CONTROLLABLE DRIVE FOR A MOVABLE RELEASER OF A MOTOR VEHICLE FRICTION CLUTCH

Rudy Tellert, Schweinfurt, and Rudolf Peschel, Poppenhausen, both of Fed. Rep. of Germany, assignors to Sachs-Systemtechnik GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Jun. 13, 1984, Ser. No. 620,105
Claims priority, application Fed. Rep. of Germany, Jun. 15, 1983, 3321578
Int. Cl.[4] F16D 25/00
U.S. Cl. 192—3.58 3 Claims



1. In a controllable drive for a movable releaser (11) of a friction clutch (3) coupling a transmission (5) of a motor vehicle with an internal combustion engine (1) of the motor vehicle, comprising

(a) a servo unit (17) operated one of hydraulically or pneumatically and having an input element (35) and an output element (51), said servo unit beig arranged for transmitting the force applied to the input element (35) amplified to the output element (51), the output element (51) being coupled with the releaser (11) for displacing the releaser in the release direction and in the case of a movement of the input element (35) the output element executes a movement proportional thereto,

(b) a buffer (49) between the input element and the output element, whereby when the force amplification of the servo unit (17) is not available, the buffer transmits the force applied to the input element in the release direction directly to the output element (51), and

(c) an electromotor (15) with a rotatable output shaft (63) and a force transmitting device (65, 67) coupling the output shaft (63) with the input element (35) of the servo unit (17), said force transmitting device changes a rotating motion of the output shaft (63) into the actuating movement of the input element (35), wherein the electromotor (15) is so dimensioned that its starting torque suffices for the movement of the releaser (11) of the friction clutch (3) with the servo-unit (17) out of action, but its nominal torque does not.

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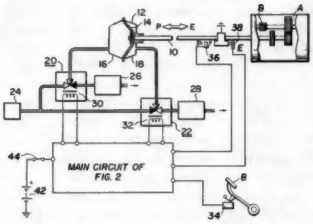
4,591,035

## CONTROL DEVICE FOR CONTROLLING SELECTION OF GEAR RATIO IN SECONDARY TRANSMISSION

Masahiro Ueda, and Shigeo Shigeyama, both of Aichi, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Mar. 21, 1984, Ser. No. 592,011
Claims priority, application Japan, Jun. 3, 1983, 58-99236
Int. Cl.[4] B60K 41/22
U.S. Cl. 192—3.59 28 Claims




1. A control device for controlling selection of a gear ratio in a secondary transmission in which a driver manually actuates a clutch, comprising:

(a) drive means for performing selection of the gear ratio in the secondary transmission;

(b) a clutch sensor which detects a disconnected situation of the clutch and produces a detect signal indicative thereof; and

(c) control means for preventing misoperation of the clutch by the driver by controlling the drive means in response to the detect signal detected by the clutch sensor and selecting the gear ratio only when the clutch is in the disconnected situation for preventing the secondary transmission from being damaged due to a driver's misoperation of the clutch.

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4,591,036

## SINGLE REVOLUTION CLUTCH

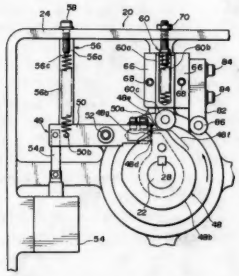
Takashi Shiga, Fuchu, Japan, assignor to Osawa Press Mfg. Co., Ltd., Japan

Filed Dec. 28, 1984, Ser. No. 687,480
Int. Cl.[4] F16D 15/00, 41/02
U.S. Cl. 192—27 5 Claims

1. A clutch comprising:

(a) an inner clutch member of a cylindrical shape for being fixedly mounted on a shaft having an axis of rotation;

(b) a bushing mounted on said inner clutch member for angular movement about the axis of the shaft;
(c) an outer clutch member mounted on said bushing and being connectable to drive means for being driven for rotation at a predetermined speed;
(d) coupling means carried by said bushing and interposed between said inner and outer clutch members for locking engagement with said inner and outer clutch members;
(e) a first cam of a generally circular shape fixedly mounted on the shaft for rotation therewith, said cam having around its periphery a cam surface having an actuating section and a pair of acceleration and deceleration sections on opposite sides of said actuating section, said cam having a projection;
(f) a second cam mounted on said first cam for angular movement relative thereto and coupled to said bushing, said second cam having a cam surface;
(g) keeper means engageable with said projection for holding said first cam against rotation, said keeper means being operable to become disengaged from said projection;
(h) actuator means movable into and out of an operative position in which said actuator means is engageable with said actuating section of said first cam for initiating the rotation of said first cam when said keeper means becomes disengaged from said projection, said actuator means being engageable with said acceleration section at an



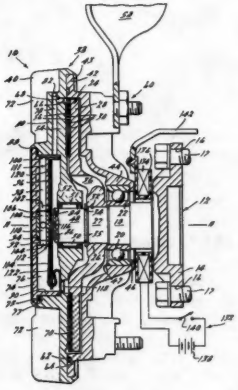
initial portion of one revolution of said first cam to rotate said first cam at a speed generally corresponding to said predetermined speed of rotation of said outer clutch member, said actuator means being engageable with said deceleration section at a final portion of the revolution of said first cam to decelerate the speed of rotation of said first cam, and at the final portion of the revolution of said first cam, said actuating section being engageable with said actuator means for setting it in its operative position;
(i) engaging means engageable with said cam surface of said second cam during the initial and final portions of the revolution of said first cam; and
(j) urging means for urging said second cam to angularly move in one direction when said engaging means becomes disengaged from said cam surface of said second cam immediately after the initial portion of the revolution of said first cam, thereby angularly moving said bushing relative to said inner clutch member to bring said coupling means into locking engagement with said inner and outer clutch members to connect them together;
(k) said engaging means being engageable with said second cam immediately before the final portion of the revolution of said first cam, thereby angularly moving said second cam in the other direction to angularly move said bushing relative to said inner clutch member to bring said coupling means out of locking engagement with said inner and outer clutch members to disconnect them.

**4,591,037**

## ROTARY MAGNETIC CONTROL FOR A VISCOUS FLUID COUPLING

**Warren G. Bopp, Farmington Hills, Mich., assignor to Eaton Corporation, Cleveland, Ohio**

**Continuation of Ser. No. 327,007, Dec. 3, 1981, Pat. No. 4,458,798. This application Dec. 27, 1983, Ser. No. 565,958**
**The portion of the term of this patent subsequent to Aug. 31, 1999, has been disclaimed.**
**Int. Cl.[4] F16D *35/00, 43/25***
**U.S. Cl. 192—58 B** **18 Claims**



1. A viscous fluid clutch comprising:
first and second members mounted for relative rotation about a common axis and defining cooperating shear surfaces forming an operating chamber therebetween;
a return passageway operative to direct viscous fluid from a said operating chamber to a storage chamber as a function of relative rotation between said members; and
valve means carried by one of said members and operable to frictionally engage the other of said members to effect modulation of fluid flowing within said return passageway.

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**4,591,038**

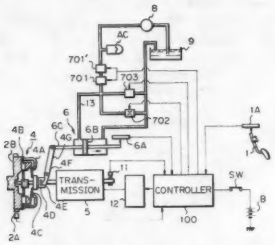
## AUTOMATIC CLUTCH CONTROL SYSTEM

**Yasuyoshi Asagi, Kawasaki; Noriaki Ogawa, Tokyo; Hitoshi Kasai, Kawasaki; Toshihiro Hattori, Ayase; Masaki Ishihara, Fujisawa, and Makoto Uriuhara, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Jun. 13, 1984, Ser. No. 620,090**
**Claims priority, application Japan, Jun. 16, 1983, 58-108248; Jun. 16, 1983, 58-108247**
**Int. Cl.[4] B60K *41/28***
**U.S. Cl. 192—0.073** **13 Claims**

1. An automatic clutch control apparatus, for use in automobiles which have an accelerator pedal, a clutch actuated via solenoid valves, a throttle actuator on an engine and a transmission having changeable gears, comprising:
accelerator sensing means, coupled to the accelerator pedal, for sensing accelerator pedal position;
engine speed sensing means, coupled to the engine, for sensing engine speed;
clutch stroke sensing means, coupled to the clutch, for sensing clutch stroke;
automobile speed sensing means, coupled to the transmission, for sensing automobile speed; and
control means, operatively connected to said accelerator sensing means, said engine speed sensing means, said clutch stroke sensing means and said automobile speed sensing means, for controlling opening and closing of the

solenoid valves, the gear change of the transmission and opening and closing of the throttle actuator, based on predetermined stored data and based on the position of the




accelerator pedal, engine speed, clutch stroke and automobile speed, for automatic control of clutch moving time and clutch moving speed.

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**4,591,039**

## CLUTCH RELEASE GROUP FOR A ROTARY CLUTCH ASSEMBLY

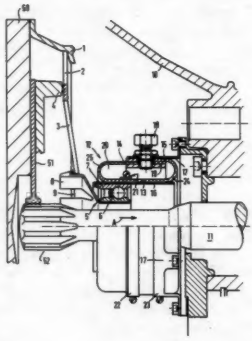
**Dieter Lutz, Schweinfurt, and Wolfgang Thieler, Hassfurt-Uchenhofen, both of Fed. Rep. of Germany, assignors to SACHS-Systemtechnik GmbH, Schweinfurt, Fed. Rep. of Germany**

**Filed Feb. 28, 1983, Ser. No. 470,624**

**Claims priority, application Fed. Rep. of Germany, Mar. 6, 1982, 3208185**

**Int. Cl.[4] F16D** *25/08, 13/75;* **F01B** *19/04;* **F16J** *3/02*

**U.S. Cl. 192—91 A** **20 Claims**



1. In a clutch release group for a rotary clutch assembly said rotary clutch assembly comprising

(1) first rotor means (**50, 1, 4**) and second rotor means (**51**) for rotation about a common axis;

(2) first frictional engagement means and second frictional engagement means mounted for common rotation with said first rotor means (**50, 1, 4**) and said second rotor means (**51**), respectively;

(3) spring means (**2**) establishing frictional engagement of said first and second frictional engagement means;

(4) at least one torque transmission shaft (**11**) extending along said axis and connected for common rotation with one (**51**) of said rotor means (**50, 1, 4; 51**), and

(5) at least one disengagement member (**3**) mounted for rotation about said torque transmission shaft (**11**) with one (**50, 1, 4**) of said rotor means (**50, 1, 5; 51**) and being axially displaceable in a first axial direction (A) along said axis against the action of said spring means (**2**) in order to disengage said frictional engagement means;

said clutch release group comprising

(a) stator means (**17**) surrounding said torque transmission shaft (**11**);

(b) first ring means (**7, 16**) surrounding said torque transmission shaft (**11**);

(c) annular fluid operated driving means (**12, 18**) for axially displacing said first ring means (**7, 16**) with respect to said stator means (**17**);

(d) second ring means (**6, 8, 9**) mounted for common axial movement with said first ring means (**7, 16**) and rotatably mounted with respect to said first ring means (**7, 16**), said second ring means (**6, 8, 9**) acting upon said disengagement member (**3**) in response to axial displacement of said first ring means (**7, 16**) by said fluid operated driving means (**12, 18**); the improvement comprising

that said fluid operated driving means (**12, 18**) comprise a flexible toroidal membrane member (**12**) surrounding said torque transmission shaft (**11**) and having radially inner substantially axially extending wall means (**13**), radially outer substantially axially extending wall means (**14, 15**) and first and second transition wall means (**24, 25**) adjacent respective axial ends of said radially inner and radially outer substantially axially extending wall means (**13; 14, 15**), a toroidal chamber (**20**) being defined within said toroidal membrane member (**12**), said toroidal chamber (**20**) having different radial widths adjacent said first and second transition all means (**24, 25**), respectively, one (**14, 15**) of said substantially axially extending wall means (**13; 14, 15**) being supported in axial direction by said stator means (**17**), the other one (**13**) of said axially extending wall means (**13; 14, 15**) acting upon said first ring means (**7, 16**) in order to obtain axial movement thereof, said toroidal chamber (**20**) being provided with fluid inlet means (**18**), variation of fluid pressure within said toroidal chamber (**20**) effecting axial movement of said other substantially axially extending wall means (**13**) and said transition wall means (**24, 25**) with respect to said stator means (**17**) such as to axially displace said first and second ring means (**7, 16; 6, 8, 9**) and said disengagement member (**3**) against the action of said spring means (**2**) in order to disengage said frictional engagement means.

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**4,591,040**

## CLUTCH DISC FOR A MOTOR VEHICLE FRICTION CLUTCH

**Alfred Schraut, Waigolshausen, and Helmuth Weissenberger, Theilheim, both of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany**

**Filed Jul. 7, 1983, Ser. No. 511,670**

**Claims priority, application Fed. Rep. of Germany, Jul. 20, 1982, 3227004**

**Int. Cl.[4] F16D** *23/10*

**U.S. Cl. 192—106.2** **11 Claims**

1. A clutch disc for a motor vehicle friction clutch comprising:

(a) a hub which defines a rotation axis;

(b) two cover plates held axially fast on the hub and held fast in rotation on the hub with axial distance from one another;

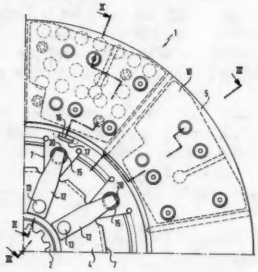
(c) a driven plate arranged between the cover plates and mounted rotatably through a limited angle of rotation in relation to the cover plates about the rotation axis but axially movably on the hub;

(d) friction linings mounted on both sides of said driven plate and located radially outside the cover plates;

(e) compression springs located in axially opposite windows of the driven plate and of the cover plates, said springs being stressable in relative rotation between the driven plate and the cover plates;

(f) friction rings arranged between the driven plate and each of the two cover plates with said rings laterally enclosing the hub;

(g) a spring device secured to the hub and arranged on the side of one of the cover plates remote from the driven plate, for generating a pressure application force initially stressing the friction rings axially against the driven plate;
(h) a presser plate enclosing the hub in annular form arranged between the one cover plate adjacent the spring



device and the friction ring adjacent said one cover plate, which presser plate is guided fast in rotation but axially displaceable on said one cover plate, and
(i) pressure transmission elements axially displaceably arranged in openings provided in said one cover plate in the region of the presser plate which elements transmit axial spring forces of the spring device to the presser plate.

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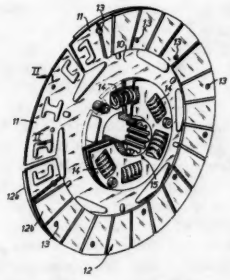
**4,591,041**

## CLUTCH FRICTION DISK COMPRISING BALANCING MEANS

**Carlo Valier, Pino Torinese, Italy, assignor to Valeo, Paris, France**

**Filed Dec. 8, 1983, Ser. No. 559,380**
**Claims priority, application France, Dec. 9, 1982, 82 20633**
**Int. Cl.[4] F16D *11/00, 13/60***
**U.S. Cl. 192—107 R** **29 Claims**



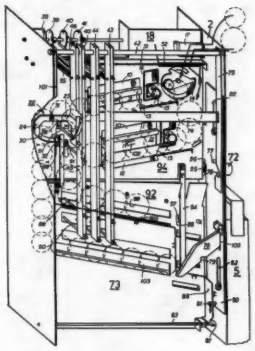
1. A clutch friction disk comprising a hub, at least two friction facings, an annular support for carrying said friction facings and coupled to said hub, fixing members attaching said friction facings to respective sides of said support, and including an axial bore and balancing weights received in said axial bore of at least some of said fixing members.

**4,591,042**

## COIN MACHINE FOR A NEWSPAPER, MAGAZINE, FOOD OR OTHER ITEM DISPENSING APPARATUS

**Hans Wenner, Im Emmertsgrund 13, 6900 Heidelberg, Fed. Rep. of Germany**

**Filed Apr. 28, 1982, Ser. No. 372,548**
**Int. Cl.[4] G07F *5/06***
**U.S. Cl. 194—225** **16 Claims**



1. A coin-operated dispensing machine for newspaper, magazine, food or other item comprising:
(a) a housing with front and rear walls and a vertical carrier plate located between the housing front and rear walls;
(b) a coin mechanism means for receiving and checking different types of coins and for releasing the dispensing machine when the correct coins for the item sales price have been inserted, the coin mechanism means including
(i) at least one coin-checking plate arranged on the vertical carrier plate in a parallel plane to the carrier plate and having a coin-checking device for checking different types of coins;
(ii) coin-collecting conduit means for holding and releasing inserted coins received from said coin-checking plate, the coin-collecting conduit means including a coin-conduit plate parallel to the carrier plate for forming the side walls of coin-collecting conduits, connecting with the coin-checking plate, and having inclined slots, and a lower plate having inclined angular projections extending through said inclined slots for forming the bottoms of the coin-collecting conduits defined between the coin-conduit plate and carrier plate, said lower plate also being parallel to the carrier plate and being pivotal about an axis so that the angular projections can be tilted out of the inclined slots of the coin-conduit plate for releasing coins positioned in the coin conduits; and
(iii) sensing and blocking mechanism means for sensing coins positioned in the coin-collecting conduits and controlling the opening of the dispensing machine, the sensing and blocking mechanism means including a moveable control mechanism for controlling opening of the dispensing machine, a blocking mechanism for releasing or blocking movement of the control mechanism, and a plurality of pivotable and vertically arranged spring-loaded sensor levers with sensor bolts located thereon for extending through the inclined slots of the coin-conduit plate in the absence of coins or engaging coins positioned in the coin-collecting conduits, said spring-loaded levers acting on said blocking mechanism in accordance with the coins sensed in the coin-collecting conduits for releasing or blocking movement of the control strip.

4,591,043

## MECHANISM FOR SPACING AND CONVEYING ARTICLES IN A PACKAGING MACHINE

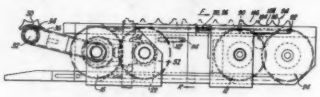
Rolf Müller, Konz, Fed. Rep. of Germany, assignor to The Mead Corporation, Dayton, Ohio

Filed Apr. 16, 1984, Ser. No. 600,758

Claims priority, application United Kingdom, Apr. 22, 1983, 8311035

Int. Cl.[4] B65G 47/26

U.S. Cl. 198—425 5 Claims



1. In a packaging machine in which articles are conveyed along a feed path and formed into groups for subsequent packaging, a spacer and conveying mechanism comprising a set of endless chains and a series of spacer and conveyor elements mounted thereon, each of said elements having an operative face effective to convey said articles in spaced relationship and being arranged to move along a working path in the feed direction of the articles during which said elements engage said articles in the feed path so as to form groups of articles and convey said groups along the feed path and, after releasing said groups, move along a parallel return path opposite to the feed direction, characterized in that said set of endless chains comprises an upper chain and a lower chain mounted for synchronous movement on sprockets disposed in spaced horizontal planes, said upper and lower chains being vertically aligned with each other but longitudinally offset in the direction of the feed path, and in that each of said spacer and conveyor elements has the leading end thereof attached to one of said chains and the trailing end thereof attached to the other of said chains by means of pivotal connections, said upper chain being offset relative to said lower chain by an amount which is substantially equal to the distance between said connections between said leading and trailing ends of said elements and the respective chains, whereby said spacer elements are moved from the return path into the working path, and vice versa, transversely of the feed direction and held throughout its movement so that the operative faces thereof face toward said feed path.

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4,591,044

## APPARATUS FOR FEEDING WAFERS AND THE LIKE

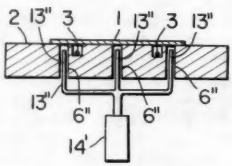
Nobutoshi Ogami, and Noritaki Mori, both of Hikone, Japan, assignors to Dainippon Screen Mfg. Co. Ltd., Kyoto, Japan

Filed Jan. 29, 1985, Ser. No. 696,020

Claims priority, application Japan, Feb. 13, 1984, 59-25823

Int. Cl.[4] B23Q 7/00

U.S. Cl. 198—346.3 7 Claims




1. An apparatus for feeding wafers or the like along a path to a processing section, and moving the same therefrom to a succeeding process, said apparatus comprising:

belt conveyor means drivable along the feed path of the wafers or the like and having a top surface that is horizontally maintained;

means for raising and lowering said belt conveyor means, thereby allowing the wafers or the like thereon to come into or out of position on the processing section;

at least one processing plate associated with the processing section to which at least a suction tube is connected, said tube being adapted to allow a vacuum to pass therethrough so as to hold the wafer on said processing plate, said processing plate being provided with at least a first pair of parallel grooves on its upper surface adapted to receive the belt conveyor means when the wafer or the like is placed on the processing plate; and

elevator means, substantially cooperating with said belt conveyor means, for raising the wafer or the like to detach said wafer from the processing plate, said elevator means being arranged such that it protrudes and withdraws with respect to the upper surface of the processing plate.

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4,591,045

## METHOD AND DEVICE FOR ALIGNING FISH

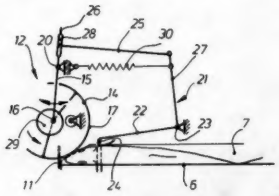
Werner Wenzel, Lübeck, Fed. Rep. of Germany, assignor to Nordischer Maschinenbau Rud. Baader GmbH & Co. KG, Lübeck, Fed. Rep. of Germany

Filed Dec. 15, 1983, Ser. No. 561,876

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1982, 3246759

Int. Cl.[4] B65G 47/26

U.S. Cl. 198—456 6 Claims

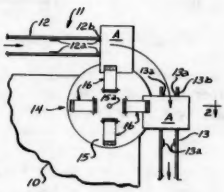



1. A device for aligning fish having a head including head flanks and a rump, said rump defining a longitudinal axis of said fish, said device comprising conveyor means moving said fish transversely to said longitudinal axis in a conveying direction and equipped with conveying chamber means defining support surface means for said fish and being separated from each other by means of lateral limiting elements extending transversely to said conveying direction, and further comprising displacement means for displacing said fish within said conveying chamber means, said displacement means comprising a displacing element entering between said lateral limiting elements of and in time with said conveying chamber means guided past said displacement means and a braking element which comes into contact with one of said flanks of each of said fish and is in operable relationship with said displacing means, wherein said displacing element comprises driven rotational body means which rotate around said first axis means extending essentially parallel to said conveying direction of said conveyor means besides the latter, said first axis means being arranged on oscillating crank means which are pivotable about second axis means extending essentially parallel to said first axis means, wherein circumferential surface means defined by said rotational body means are arranged at a small distance above said support surface means and to move against said fish, and wherein cam disc means running coaxial with said rotational body means are provided for timing said said displacement means, which cam disc means resiliently bear against supporting roller means.

## 4,591,046
## TURNTABLE TRANSFER MECHANISM FOR CONVEYORS

**Edward N. Toste, Jr., Cromwell, and Daniel Clifford, Oakdale, both of Conn., assignors to R. R. Donnelley & Sons Company, Chicago, Ill.**

**Continuation of Ser. No. 481,916, Apr. 4, 1983, abandoned. This application Feb. 8, 1985, Ser. No. 700,054**
**Int. Cl.[4] B65G *47/26***
**U.S. Cl. 198—457** **11 Claims**



7. In a lugged chain conveyor system for broad, flat, generally rigid articles the end portions of which project laterally outside the conveyor chains and which as first and second generally coplanar conveyor elements disposed at an angle to one another, so an article must traverse a corner to pass from a discharge end of the first conveyor element to a receiving end of the second conveyor element, an article transfer mechanism comprising, in combination:

a turntable which is driven about an axis in timed relationship to the rate of travel of the conveyor elements so that the peripheral speed of the turntable matches the linear speed of the conveyor elements, the axis of the turntable being on a line that bisects the angle between the conveyor elements, the turntable having an upper surface at least the peripheral portion of which is entirely planar, and said peripheral portion of the turntable underlying a projecting end portion of each article on the conveyor elements;

a plurality of pivots located equidistantly about the upper surface of the turntable, said pivots being in a plane above and parallel to the planar portion of the turntable;

a plurality of grippers each of which comprises a rigid arm mounted on one of said pivots and a broad, resilient gripping plate at a distal end of said arm, and a gripping pad on the underside of each resilient gripping plate confronting the planar peripheral portion of the upper surface of the turntable;

means biasing said grippers about the pivots to a normal position in which their gripping end portions are in spaced relationship to the turntable and above the plane of the upper surfaces of said articles;

and means for lowering each of said grippers to clamp an article as it leaves the discharge end of the first conveyor element and to release said gripper from the clamped article when it is above the receiving end of the second conveyor element.

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## 4,591,047
## CALADRYL DISPLAY

**David March, New York, N.Y., assignor to Thomson Leeds Company Inc., New York, N.Y.**

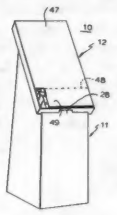
**Filed Aug. 15, 1984, Ser. No. 641,026**
**Int. Cl.[4] B65D *5/52, 85/20***
**U.S. Cl. 206—45.18** **13 Claims**

1. A display and dispensing device comprising:

a hollow base unit collapsible to a lay flat condition and including upright relatively short front and long rear walls and side walls extending between corresponding edges of said front and rear walls and hingedly connected thereto, said side walls having coplanar upwardly rearwardly inclined top edges;

a separate platform panel resting on and extending laterally between and beyond the lower portion of said base unit side wall top edges and being coupled and restricted against lateral and forward movement relative to said base unit; and

a product container unit having a bottom wall separably resting on said platform panel and being restricted against



downward movement from a predetermined position along said platform panel, said container unit including front, rear and side walls projecting upwardly from the corresponding edges of said bottom wall and having an opening in the top thereof providing access to the interior of said container.

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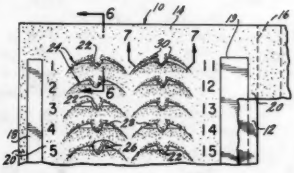
## 4,591,048
## DISPOSABLE COLLECTOR FOR SURGICAL IMPLEMENTS

**John D. Eldridge, Jr., Newport Beach, Calif., assignor to American Hospital Supply Corp., Evanston, Ill.**

**Continuation of Ser. No. 374,789, May 4, 1982, abandoned, which is a continuation-in-part of Ser. No. 16,971, Mar. 2, 1979, abandoned. This application Jan. 29, 1985, Ser. No. 696,146**
**Int. Cl.[4] A61L *17/02***
**U.S. Cl. 206—63.3** **12 Claims**



1. A collector for surgical needles comprising:

(a) a collector unit;

(b) a plurality of depressions in said unit, each of said depressions being formed by an inclined ramp surface which slopes downward from a crest into a recess, adjacent crest and recesses forming a shoulder, each of said ramp surfaces being generally parallel to, but offset from the adjacent ramp surfaces, said recess being of a shape and depth to permit a surgical needle to nest within said recess and to lie along said ramp surface, said shoulder and crest being adapted to confine said needles within the recess.

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## 4,591,049
## HERMETICALLY SEALED TWO-COMPONENT MIXING SYSTEM

**Carl W. Walter, Holliston, and John L. Woodworth, Hopkinton, both of Mass., assignors to Kidde, Inc., Saddle Brook, N.J.**

**Filed Jan. 16, 1984, Ser. No. 570,804**
**Int. Cl.[4] B65D *25/08***
**U.S. Cl. 206—222** **18 Claims**

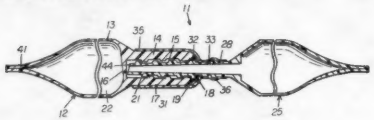
1. A mixing and dispensing receptacle comprising:

a first unitary container defining a first nozzle portion comprising a smoothly tapered male Luer slip connection having an 0.060 inch taper per inch and adapted for engagement with a mating coupling member, a first sealed

chamber retaining a first substance, and a rupturable wall portion separating said first chamber from the interior of said first nozzle portion;

a second unitary container defining a second nozzle portion and a second chamber retaining a second substance, said second nozzle portion being disposed at least partially within said interior of said first nozzle portion and circumferentially sealed thereto so as to sealingly isolate said second substance, and wherein said second nozzle portion is movable axially relative to said first nozzle portion so as to pierce said rupturable wall portion and provide communication between said first and second chambers; and

an aseptic shield means covering said Luer slip connection and removable therefrom.



14. A method of producing a mixing and dispensing receptacle comprising the following steps:

molding a first unitary container that defines a first nozzle portion comprising a smoothly tapered male Luer slip connection having an 0.060 inch taper per inch and adapted for engagement with a mating coupling member, a first chamber, and a rupturable wall portion separating said first chamber from the interior of said first nozzle portion; introducing a first substance into said first chamber; hermetically sealing said first chamber;

molding a second unitary container that defines a second nozzle portion and a second chamber; engaging said second nozzle portion within said first nozzle portion to provide a seal therebetween, said second nozzle portion being movable axially relative to said first nozzle portion so as to pierce said rupturable wall portion and provide communication between said first and second chambers;

introducing a second substance into said second chamber; and hermetically sealing said second chamber.

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**4,591,050**

## TWO-COMPONENT PACKAGE

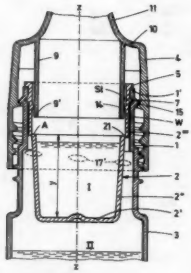
**Robert-Günter Finke, Finnentrop; Clemens Schumacher, Sundern; Albert Kolb, Darmstadt-Eberstadt; Horst Lautenschläger, Modautal, and Jürgen Konetzka, Darmstadt-Eberstadt, all of Fed. Rep. of Germany, assignors to Robert Finke Kommanditgesellschaft, Finnentrop, Fed. Rep. of Germany**

**Filed Jul. 26, 1984, Ser. No. 634,904**

**Claims priority, application Fed. Rep. of Germany, Jul. 30, 1983, 3327615**

**Int. Cl.[4] B65D** *25/08, 1/04*

**U.S. Cl. 206—222** **13 Claims**



1. In a two-component package having a cup arranged in a neck of the package to receive one component, and a screw cap, said cup defining an intended break line thereon, said cap cooperating with the neck of the package and having a collar which extends into the cup, said collar defining an abutment edge at the front end thereof, said cup cooperating with said cap in a basic sales position, said abutment edge disposed for separating the cup in the region of said break line upon a screwing of the cap beyond the basic sales position, the improvement comprising

said cup defines a cup wall, said wall having an annular step defined therein,

said step defining said break line spaced above the bottom of said cup,

said abutment edge of said collar being aligned with said annular step,

an inner surface of said cup wall has a bead inwardly directed therefrom, said bead disposed above said annular step engaging against an outer surface of said collar.

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**4,591,051**

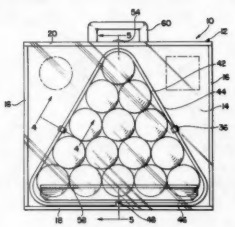
## BILLIARD BALL AND RACK STORAGE CASE

**Michael E. Lowman, 29 Rose Ct., Narragansett, R.I. 02882**

**Filed Apr. 23, 1985, Ser. No. 726,654**

**Int. Cl.[4] B65D** *85/58*

**U.S. Cl. 206—315.9** **4 Claims**



1. A combination billiard ball and rack storage case comprising a box-like cover having a top wall and side, front, and rear walls downwardly extending therefrom and an open bottom closeable by a slidable bottom wall inwardly movable towards said rear wall and outwardly movable past said front wall in a generally horizontally oriented attitude when said cover is similarly horizontally disposed, a pair of laterally opposed horizontally oriented grooves disposed in said side walls for slidably receiving said bottom wall, said grooves of a vertical height substantially greater than the vertical thickness of said bottom wall and means for releasably positioning a billiard rack within said cover at a position vertically above said grooves, said grooves including means for elevating said bottom wall at the end of its inward travel whereby said bottom wall will initially contact and slightly elevate balls from the table during its initial inward travel and thereafter at the end of its travel further elevate said balls into contact with said upper walls, said elevating means comprising first elevating means in the form of an elevated ramp at the end of each of said grooves.

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**4,591,052**

## SMALL COMPONENT STORAGE APPARATUS

**Gerard Jaeger, Colmar, France, assignor to ITT Industries, Inc., New York, N.Y.**

**Continuation of Ser. No. 549,236, Nov. 4, 1983, abandoned. This application Aug. 8, 1985, Ser. No. 763,948**

**Claims priority, application France, Nov. 9, 1982, 82 18780**

**Int. Cl.[4] B65D** *73/02*

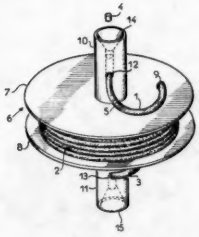
**U.S. Cl. 206—328** **1 Claim**

1. A component storage unit for small size components comprising:

a tubular body for containing a plurality of said components in a predetermined orientation in which said components slide, said tubular body being coiled around an axis;

a coil former supporting said coiled tubular body, said tubular body including first and second end portions extending

through a wall of said coil former and each running along and maintained in position on said axis, said coil former including a cylindrical body, a first web on said cylindrical body supporting said first end of said coiled tubular body, and a second web on said cylindrical body supporting said second end of said coiled tubular body;



a shaft coupled to said coil former for support and rotation thereof, said shaft including a bore on one end in communication with said first end portion, and a bore on its other end in communication with said second end portion, each of said bores communicating inside said shaft with a conduit having a flair at the end of said shaft, said flairs serving as support for the coil former between two points and guides for the loading and unloading of said components to and from said storage unit.

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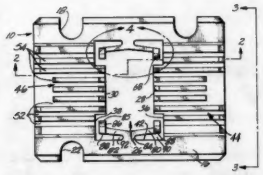
**4,591,053**

## INTEGRATED CIRCUIT CARRIER

**James C. Alemanni, Oceanside, Calif., assignor to Gibson-Egan Company, Duarte, Calif.**

**Filed Jul. 6, 1984, Ser. No. 628,232**
**Int. Cl.[4] B65D *73/02***
**U.S. Cl. 206—331** **14 Claims**



1. A carrier for an integrated circuit flat pack having a body with a plurality of leads projecting from opposite ends of the body, the carrier comprising a base; an opening in the base for receiving the body of the flat pack, the opening having opposite ends, spaced apart sides each extending between the opposite ends of the opening, and corner regions at the opposite ends of each side of the opening; lead-supporting walls adjacent the opposite ends of the opening having a plurality of grooves for receiving the leads of the flat pack, the grooves extending along generally parallel axes that traverse the opening; resilient retaining fingers supported from generally central regions of support on the opposite sides of the opening between said lead-supporting walls of the base, the retaining fingers on each side of the opening extending from said central region of support in opposite directions toward the respective corners of the opening and extending generally parallel to the length of the grooves in the lead-supporting walls, the retaining fingers having tips with lead-connecting means that project toward the opening generally perpendicular to the length of the fingers and to the length of the grooves at the opposite ends of the opening; the retaining fingers being bendable outwardly away from the opening under application of an external bending force generally horizontally outwardly for allowing the leads of the flat pack to bypass the bent retaining fingers and fit into the grooves at opposite ends of the opening, the retaining fingers returning to a normal locking position, when the external bending force is released, for positioning the lead-connecting means at the tips of the fingers over adjacent leads of the flat pack for retaining the flat pack body in the opening of the carrier.

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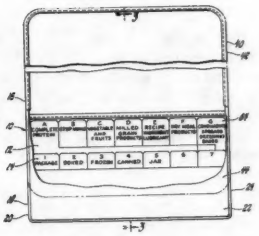
**4,591,054**

## COMBINATION PURSE-COUPON ORGANIZER DEVICE, METHODS OF CONSTRUCTING AND UTILIZING SAME

**Carolyn S. Blossom, 202 S. Main, Concord, Mich. 49237**

**Filed Jul. 23, 1984, Ser. No. 633,285**
**Int. Cl.[4] B65D *85/00***
**U.S. Cl. 206—425** **7 Claims**



1. A combination purse/coupon organizer, comprising in combination:

a purse including a main body part, said main body part defining a first interior pocket;

a partition within the purse spaced relative to the main body of the purse to define a second interior pocket of approximately the same dimensions as said first pocket;

a flap, overlying said pockets, having a first end hinged to the exterior of said main body part, and having a second end securable to the main body part of the purse at a location removed from and opposed to the point of attachment of the first flap end;

a means for arranging coupons positioned within said pocket purse;

said arranging means including a first master set of seventh cut index cards;

a subset of index cards associated with each card in said master set;

each card in said subset being smaller than the card in the master set with which it is associated;

a different label on each master card for relating each master card to a category of coupons which are to be associated with it;

a different label on each subset card relating each card in a subset to a sub-category of coupons which are to be associated with that card; and wherein

each card in the master set is a different color, and the cards in each subset are the same color as the master card with which they are associated.

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**4,591,055**

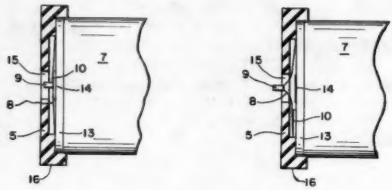
## VACUUM PACKAGE FOR TRANSIT

**Ronald J. Corn, 52 Blockland Dr., Longmeadow, Mass. 01106**

**Filed Jul. 24, 1985, Ser. No. 758,290**
**Int. Cl.[4] B65D *81/20, 55/02***
**U.S. Cl. 206—459** **10 Claims**

1. A package for storing and shipping perishable items of produce, meats, and flowers, comprising of a tubular chamber substantially cylindrical in shape, cover plates, each adapted to fit over each end of the opening in said tubular chamber, means for securing said cover plates to the ends of the tubular chamber, a plurality of openings in the periphery of each of said cover plates, a painted red circular spot in the center area of

each of said cover plates, a transparent plastic film designed to circumscribe said tubular member, a disc preferably green in color adapted to cover said red spot on said cover plate, mechanical sealing clips adapted to close each end of said plastic film after the air has been removed from said tubular chamber through said openings in the cover plates and the open ends of




said plastic film whereby the contents within the tubular chamber is maintained under a vacuum seal excluding the outside atmosphere and air, and whereby the cylindrical wall of the tubular chamber prevents the contents therein from being crushed both while the air is drawn off to create the vacuum, and during storage and shipment.

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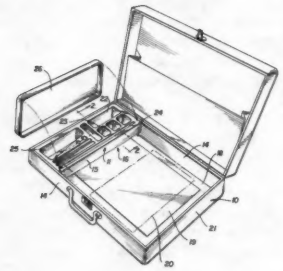
**4,591,056**

**ORGANIZER FOR ATTACHE CASES**

**Michael E. Groch, 8207 Bardmoor Pl., #202, Seminole, Fla. 33543**

**Filed Sep. 26, 1985, Ser. No. 780,305**
**Int. Cl.[4] B65D *1/34***
**U.S. Cl. 206—564** **4 Claims**



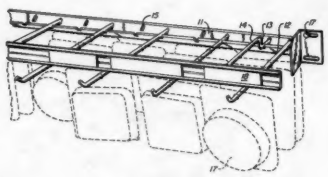
**1**. An organizer insert for a rectangular carrying case comprising a unitary substantially rectangular elongated insert body adapted to fit snugly into one end portion of a rectangular case while extending substantially for the distance between the longitudinal walls of the case and substantially abutting one end wall of the case, the insert body having a height whereby it can rest on the floor of a case with its top face substantially flush with the top of the body portion of a case, the insert body having a plurality of open top depressed storage compartments of various depths and marginal shapes so that they can receive various articles therein, the insert body further including one longitudinal wall and two end walls whose lower edges can rest on the floor of a case stably and another longitudinal wall whose lower edge is elevated from the floor thereby forming a tunnel passage, whereby papers and the like resting on the floor of a case can project through the tunnel passage and beneath the compartments of the insert body, and a cover means for the top of the insert body.

**4,591,057**

**DELI TAG MOLDING**

**Benjamin L. Garfinkle, Alameda, Calif., assignor to Clamp Swing Pricing Co., Alameda, Calif.**

**Continuation of Ser. No. 248,491, Mar. 27, 1981, abandoned. This application May 24, 1985, Ser. No. 738,054**
**Int. Cl.[4] A47F *5/08***
**U.S. Cl. 211—59.1** **1 Claim**



**1**. An article support and display assembly comprising:

A. a longitudinally extending peg bar having means proximate its distal ends for supporting said peg bar to securely fix it in place;

B. means located along said peg bar for receiving molding support pegs and merchandise pegs;

C. at least one rod-like merchandise peg, said merchandise peg being adapted to be received by said peg bar;

D. a price tag display device having at least two slidable molding clips and a price tag molding comprising a forward track and a rearward track, said forward track being adapted to slidably receive at least one price tag and said rearward track being adapted to slidably receive at least two of said molding clips; and

E. at least one molding support peg, characterized as having a forward end and a rearward end, wherein said rearward end has a nonlinear extension that is adapted to be received by said peg bar so as to position said price tag display device above said merchandise peg while said forward end is adapted to be received by one of said molding clips, thereby defining a price tag display device that is adjustable relative to said merchandise peg independent of the position of said merchandise peg along said entire longitudinal length of said peg bar utilizing said two nonlinear extensions of said molding support pegs, and is slidably positionable relative to said merchandise peg independent of the position of said merchandise peg utilizing said slidable price tag molding and two of said molding clips.

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**4,591,058**

**SLATBOARD**

**Douglas D. Amstutz, and Donald D. Kelemen, both of Muskegon, Mich., assignors to Amstore Corporation, Muskegon, Mich.**

**Filed May 10, 1984, Ser. No. 608,872**
**Int. Cl.[4] A47F *5/08***
**U.S. Cl. 211—94** **6 Claims**

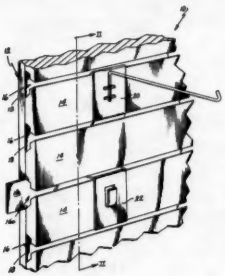
**4**. A variable decor slatboard assembly comprising:

a slatboard defining an elongated horizontal slot including a flat back wall and a mouth opposite said back wall through which hardware can be inserted into said slot;

an elongated flat decor strip slidably positioned within said slot, said strip extending substantially the full height of said back wall, whereby said decor strip can be readily removed and replaced by another decor strip to alter the appearance of said slatboard assembly; and

retaining means for retaining said decor strip flat against said back wall, said retaining means comprising upper and

lower slot walls extending away from said slot back wall and toward one another, the height of said decor strip



being substantially the same as the distance between said upper and lower slot walls at said back wall.

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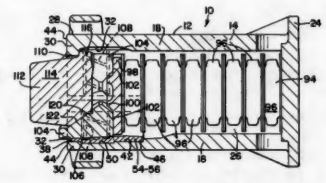
**4,591,059**

## RAILROAD CAR DRAFT GEAR ASSEMBLY WITH FRICTION BORE WEAR LINERS

**Richard C. Hammarlund, Wasco, Ill., assignor to Miner Enterprises, Inc., Geneva, Ill.**

**Filed Aug. 17, 1984, Ser. No. 641,626**
**Int. Cl.[4] B61G *9/18***
**U.S. Cl. 213—32 R** **9 Claims**



**1.** A draft gear assembly for a railroad car coupler system to absorb and cushion impacting forces placed on the system during operation of said car, the improvement therein comprising:

wear liner means to interact with a friction shoe carried by said assembly and moveable by said impacting forces, said liner means disposable in a recess formed in a housing of said gear assembly with said liner means initially deformed by said impacting forces transferred from said shoe to said liner means to increase areas of contact between said shoe and said liner means and between said liner means and said housing recess and work hardened to an operative Brinell hardness level of about 365 being about 100 Brinell points less than a hardness level of said shoe,

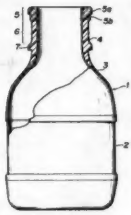
wherein said deformability of said liner means reduces dimensional mismatches between said shoe, said liner means and said housing recess to improve seating therebetween, improves wear resistance between said shoe and said liner means and inhibits movement of said liner means during subsequent car operation, and said different levels of hardness of said liner means in said work hardened state and said shoe reducing abrasive wear therebetween.

**4,591,060**

## CONTAINER OF POLYETHYLENE TEREPHTHALATE OR SATURATED POLYESTER RESIN

**Takami Tsukada, Funabashi; Akiho Ota, and Hiroaki Sugiura, both of Tokyo, all of Japan, assignors to Yoshino Kogyosho Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 331,872, Dec. 17, 1981, abandoned. This application Mar. 23, 1984, Ser. No. 592,747**
**Claims priority, application Japan, Jan. 29, 1981, 56-11949[U]**
**Int. Cl.[4] B65D *23/00*; B29C *35/00***
**U.S. Cl. 215—1 C** **5 Claims**



**1.** A hollow blow-molded container of polyethylene terephthalate resin comprising:

(a) a biaxially oriented and uncrystallized body section; and

(b) a neck section comprising an upper part and an intermediate part, said upper part comprising an upper half part and a lower half part, said intermediate part being adjacent to an upper end of said body section, said upper half part being larger in diameter and of a greater wall thickness than said lower half part, a stepped part being formed between said upper half part and said lower half part, said lower half part being larger in diameter and of greater wall thickness than said intermediate part, a stepped part being formed between said lower half part and said intermediate part, said intermediate part being adjacent to and of greater wall thickness than said body section, said upper half part and said lower half part being crystallized, and said intermediate part being uncrystallized.

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**4,591,061**

## SAFETY CONTAINER FOR WASTE ORGANIC SOLVENTS

**Edward J. Hedgley, London, England, assignor to Birkbeck College, London, England**

**Filed Aug. 2, 1982, Ser. No. 404,122**
**Claims priority, application United Kingdom, Aug. 5, 1981, 8123872**
**Int. Cl.[4] A47J *41/00***
**U.S. Cl. 215—12 R** **12 Claims**

**1.** A portable safety container for temporarily storing, transporting and/or disposing of waste organic solvent mixtures, comprising:

a strong, fire-resistant, open-topped outer shell having a side wall, a continuous base and an upper rim;

an inner shell, of material resistant to chemical corrosion for holding the mixtures, fixed within said outer shell and spaced inwardly from inner surfaces of said side wall and said base, said inner shell being separated from said outer shell by a heat-insulating and shock-absorbing air space, said inner shell having a capacity, said outer shell having a capacity sufficient to hold said capacity of said inner shell upon accidental fracture of said inner shell;

an upper part with a neck of said inner shell protruding above said upper rim of said outer shell;

a lid hingedly connected to said neck which will remain open when the container is inverted for emptying and which will normally be held closed by gravity when the container is upright; and

shield means covering the neck of said inner shell, said shield

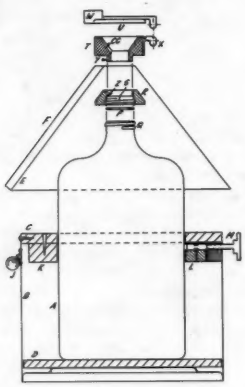
means forming a fully enclosed fire-resistant housing with said lid and said outer shell;

wherein said inner shell comprises a bottle of chemically resistance material;

said outer shell comprises a metal-containing vessel;

said neck of said bottle has a thread threadedly receiving a plastic frusto-conical member having a central orifice substantially coaxial with said neck of said bottle;

said frusto-conical member has, in addition to a thread engaging the neck of the bottle, an upper internal thread engaged by an external thread on a lower portion of a closure/funnel assembly comprising a hollow cylinder having an inverted frusto-conical internal section forming a funnel with a central orifice substantially coaxial with said orifice of said frusto-conical member, said hollow cylinder having said lid hinged thereabove;



said lid comprises a flat circular lid weighted at a portion of circumference opposite to a hinge thereof, the hinge being so designed that, in a fully open position, the lid is positioned at about 60° below the horizontal, and the weight being so chosen and designed that firstly, the lid remains in said fully open position when the safety container is inverted to empty its contents, and secondly, the lid remains in a fully closed position and is held firmly against the funnel assembly when the container is upright; and

resting upon the upper rim of the said metal-containing vessel is a frusto-conical sheet-metal shield forming a protector for the upper part of the said bottle, the diameter of said shield at its lower rim being slightly greater than that of the metal-containing vessel and its dimensions and diameter at its upper rim being selected so that the upper rim of the shield can be held securely between said closure/funnel assembly and the said plastic frusto-conical member when they are threaded together.

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**4,591,062**

## TAMPER-EVIDENT CLOSURE APPARATUS

**Jeffrey Sandhaus, Rte. 9W, Palisades, N.Y. 10964**

**Filed Dec. 24, 1984, Ser. No. 685,996**

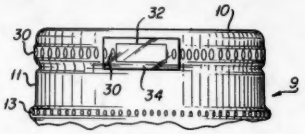
**Int. Cl.[4] B65D *55/02***

**U.S. Cl. 215—230** **18 Claims**

1. A tamper evident closure apparatus for a container, comprising:

a closure; and,

means, disposed on said closure so as to be first exposed to contents of said container upon initial opening of said container, for providing a visibly apparent chemical reaction in response to first exposure to said contents of said container upon initial opening of said container.



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**4,591,063**

## FLASK CLOSURE SYSTEM

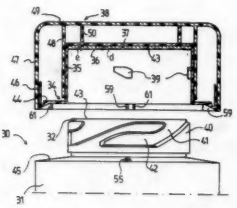
**Reinold Geiger, 38, rue de Longchamp, 92200 Neuilly sur Seine, France**

**Filed Aug. 20, 1984, Ser. No. 642,171**

**Claims priority, application France, Sep. 27, 1983, 83 15361; Jul. 6, 1984, 84 10839**

**Int. Cl.[4] B65D *41/04***

**U.S. Cl. 215—330** **8 Claims**



1. A flask device to contain, in particular, perfumes or cosmetic products comprising:

a flask body having a longitudinal axis:

a neck having an end surface and being connected to said body:

a closure system with a sealing washer facing said end surface;

a first guide means disposed on said neck;

a second guide means disposed on said closure systems;

one of said first and second guide means comprising a helical ramp cooperating with the other guide means to translate said closure system in a preselected direction in parallel with said axis with respect to said flask body while said closure is rotated to apply pressure to said washer, said ramp ending in a portion perpendicular to said axis;

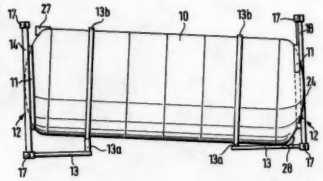
whereby during rotation corresponding to said portion the pressure on the washer remains constant; and

securing means disposed on said body and closure system for interengaging said closure system and body in a predetermined relationship when said closure reaches a preselected position as it is rotated along said portion; wherein the body of the flask is connected to the neck by a shoulder with at least a rib projecting upwards relative to the shoulder having two operative faces, cooperating means on a plate of the closure, the cooperating means of the plate of the closure including first means for cooperating with the one operative face and second means for cooperating with the other operative face, and said first means are adapted to resiliently yield when said rib moves past it, and said second means is also a rib.

## 4,591,064
## FREIGHT CONTAINER

Helmut Gerhard, Weitefeld, Fed. Rep. of Germany, assignor to Westerwaelder Eisenwerk Gerhard GmbH, Weitefeld, Fed. Rep. of Germany

Filed Dec. 6, 1984, Ser. No. 678,807
Claims priority, application Fed. Rep. of Germany, Dec. 6, 1983, 8334968[U]; Sep. 5, 1984, 8426236[U]
Int. Cl.[4] B65D *88/12*
U.S. Cl. 220—1.5 15 Claims



1. A freight container comprising:

a supporting structure having a pair of mutually spaced, substantially aligned end frames and defining a first longitudinal axis,

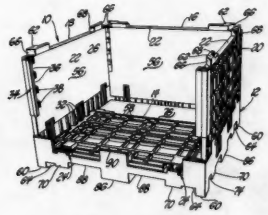
a tank disposed between said pair of end frames, and having a cylindrical shell portion defining a second longitudinal axis and spherically curved end bottom portions, and

connecting means joining said tank to said pair of end frames, said connecting means including a pair of circular end rings, each eccentrically fixed to the respective end bottom portion for mounting said tank with an inclination between said first and second longitudinal axes, such that minimal stress mounting of said tank to the end frames at a desired inclination is facilitated.

## 4,591,065
## FOLDABLE CONTAINER ASSEMBLY

Dennis M. Foy, 475 Bonnie Brier, Birmingham, Mich. 48009

Filed Sep. 25, 1984, Ser. No. 654,314
Int. Cl.[4] B65D *6/18, 6/26, 21/02*
U.S. Cl. 220—7 21 Claims

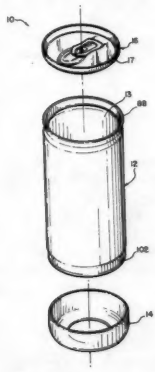


1. A foldable container assembly (10) comprising; a base (12) having a plurality of sides, at least one side wall (14, 16, 18, 20) extending vertically upwardly from each side of said base (12) with the tops (22) of said side walls all being aligned in a horizontal plane, and including hinge means (24) interconnecting each of said side walls (14, 16, 18, 20) to said base (12), characterized by said base (12) including legs (60) extending downwardly from each intersection of two sides thereof, each of said side walls (14, 16, 18, 20) having a projection (62) extending upwardly from the top (22) thereof adjacent each side edge thereof, said projection (62) of adjacent side walls (14, 16, 18, 20) coacting together in the vertical position to receive and engage said legs (60) in stacking one assembly upon another, each of said legs (60) including square exterior side surfaces and parallel interior surfaces (64) extending diagonally inwardly from said exterior side surfaces, each of said projections (62) presenting a diagonally extending surface (66) for abutting one of said diagonal interior surfaces (64).

## 4,591,066
## PLASTIC CONTAINER WITH BASE CUP FORMED FROM SINGLE BLOW MOLDED PLASTIC BODY

Bruce A. Moen, Golden, Colo., assignor to Adolph Coors Company, Golden, Colo.

Filed Jul. 25, 1984, Ser. No. 634,135
Int. Cl.[4] B65D *23/00*
U.S. Cl. 220—69 28 Claims



14. A plastic can formed from a unitary blow molded plastic body and a metal lid comprising:

A. a liquid receiving means having an opening therein and formed from a lower body section of a unitary blow molded plastic body, the liquid receiving means comprising:

a. a first annular wall portion with a relatively small radius outwardly opening cross-sectional configuration;

b. a second generally cylindrical relatively short length annular wall portion integrally connected with said first annular wall portion;

c. a third downwardly and outwardly inclined annular wall portion integrally connected with said second annular wall portion;

d. a fourth substantially cylindrical relatively long length wall portion;

e. a fifth relatively short length annular transition wall portion;

f. a sixth generally cylindrical relatively short length wall portion;

g. a seventh annular shoulder wall portion;

h. an eighth outwardly convex transversely extending wall portion;

B. a cup means for providing a support base formed from said upper body section of said blow molded plastic body and fixedly attached to said liquid receiving means, said cup means comprising:

a. an upper transversely extending concave wall portion integrally connected with said preform connection section at a central area of said concave wall portion;

b. an annular shoulder portion extending around the circumference of said concave wall portion and integrally formed therewith;

c. a cylindrical wall portion integrally formed with said shoulder wall portion; and

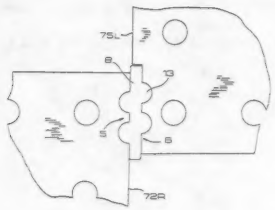
C. lid means for sealingly closing the opening in said liquid receiving means fixedly attached thereto.

**4,591,067**

## PLASTIC INSERT FOR STORAGE VESSEL

**Stuart D. Byers, Mississauga, Canada, assignor to Crophandling Systems Limited, Mississauga, Canada**

**Filed Jul. 26, 1984, Ser. No. 634,532**
**Int. Cl.[4] B65D *6/32***
**U.S. Cl. 220—81 R** **9 Claims**



1. Cylindrical storage vessel fabricated from flange-less plates fastened together with headed fasteners that pass through holes in the plates; wherein:

said plates are rectangular and arranged in rows to form the circumference of the vessel;

holes for the headed fasteners are disposed in margins contiguous with the top, bottom and side edges of a plate;

each plate has surface-to-surface contact with the plate next to it in the same row over the full height of the their side margins and over no more than the width of their side margins;

each plate has surface-to-surface contact with a plate in the row immediately above, over a height at least equal to the height of a top margin;

the plates in one row are staggered with respect to the plates in the next row above to the extent that a top portion of one side edge of a plate in the said row is in abutment with a bottom portion of the opposite side edge of a plate in the row above;

and where an insert of resiliently compressible material is placed between edges that are in abutment;

where said insert occupies a substantial portion of the length of the abutment between said edges;

said insert is placed between the said top and bottom portions of the respective side edges; and

where at least one of said top and bottom portions of each of said plates is cut inwards from the general level of the side edge of said plate.

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**4,591,068**

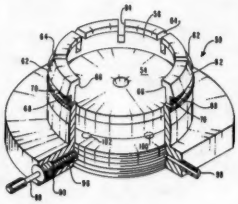
## CORE BARREL PLUG

**Ralph W. Tolino, Pittsburgh, Pa.; Ronald J. Hopkins, Pensacola, Fla.; Ray L. Congleton, Gonzalez, Fla., and Craig H. Popalis, Pensacola, Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Feb. 15, 1983, Ser. No. 466,464**
**Int. Cl.[4] F16L *55/10*; G21C *13/00***
**U.S. Cl. 220—240** **5 Claims**

1. A plug for preventing flow through a port in a core barrel of a pressurized water nuclear reactor comprising:

a substantially cylindrical body formed with a cylindrical portion and a flange and defining a tapered leading open end with the other end being closed by an end plug attached to said flange, said body defining a bore therein extending from said open end to said end plug with said bore having a smaller diameter near said open end than near said end plug, said cylindrical portion having a lip near said open end and being formed with a plurality of longitudinal slots extending from said open end toward said flange and extending entirely through the thickness of said cylindrical portion, said cylindrical portion having a circumferential first groove on the outer surface thereof located near the forwardmost portion of said cylindrical portion but not in the section of said cylindrical portion that has said slots therein, and a plurality of circumferential second grooves on the outer surface thereof located in the section of said cylindrical portion that has said slots therein, said first and second grooves establishing a seal between said cylindrical portion and the inside surface of said port when said cylindrical portion is expanded, and said flange and said end plug having a passageway defined therein for introducing a fluid into said body;



a metal ring disposed in each of said second grooves;

a mandrel slidably disposed and captured in said body and capable of being moved toward said open end of said body when said fluid is introduced through said passageway, thereby causing said cylindrical portion to be expanded into contact with the inside surface of said port; and

a locking mechanism disposed in said end plug for preventing inadvertent movement of said mandrel.

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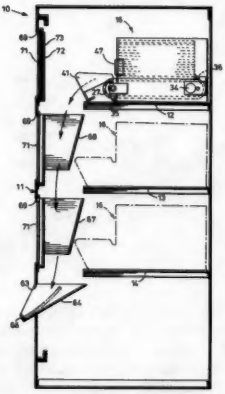
**4,591,069**

## MAGAZINE DISPENSING APPARATUS

**Jeffrey A. Stewart, 19 Wishing Well Drive, Agincourt, Ontario, Canada M1T 1H9**

**Filed Nov. 14, 1983, Ser. No. 551,710**
**Int. Cl.[4] G07F *11/00***
**U.S. Cl. 221—6** **8 Claims**



1. Magazine dispensing apparatus comprising a housing having a front wall; a plurality of magazine dispenser units within said housing; each unit comprising a platform, guide means extending upwardly therefrom and supporting a stack of magazines, retainer means for retaining the front portion of upper magazines in the stack and defining an opening extending adjacent the front of the platform and comprising an inwardly directed wall portion spaced above each side of the front edge of the platform, a member extending transversely across the width of the opening and engaging the end surface

including the lateral edges of the magazine next upwardly adjacent the lowermost magazine in the stack, and means supporting the ends of said member whereby the spacing between the member and the front edge of the platform may be adjusted, a slot extending forwardly and rearwardly in the platform, an endless conveyor disposed beneath the platform and having an upper flight of the conveyor within the slot, an ejector member mounted on the conveyor and extending laterally therefrom and sweeping out a path along the upper surface of the platform adjacent the slot when the conveyor rotates, and means for energising the conveyor to rotate it in a direction sweeping the ejector member forwardly along the platform, whereby the ejector member can engage the lowermost magazine and can drive the magazine forwardly from the unit through said opening so that the magazine falls freely from the front of the unit; said units being spaced at differing vertical levels in the housing; a delivery opening in the front wall of the housing below the or each lowermost unit; a delivery chute disposed between the or each lowermost unit and the delivery opening and positioned for receiving a magazine falling freely from a lowermost unit and for guiding it to the delivery opening; and upper chute open at its upper and lower ends positioned for receiving a magazine dispensed from the or each unit spaced above said lowermost unit or units and for guiding it toward the delivery chute; and means for selectively energizing the conveyor of each unit independently of that of each other unit.

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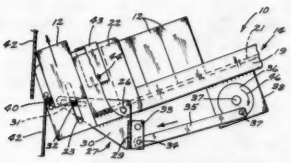
**4,591,070**

## ARTICLE DISPENSER ADJUSTABLE FOR DIFFERENT SIZE ARTICLES

**Arthur N. Wirstlin, Altoona, Iowa, assignor to Fawn Engineering Corp., Des Moines, Iowa**

**Filed May 1, 1984, Ser. No. 605,859**
**Int. Cl.[4] B65H *3/24, 31/20*; G07F *11/16***
**U.S. Cl. 221—129** **7 Claims**



1. A dispensing apparatus comprising:

tray means having sidewalls and a bottom wall for holding a plurality of containers to be dispensed in a line with the bottoms of the containers being in substantial alignment;

means for causing the containers in said tray means to move towards the front end thereof;

stop means attached to the front end of the tray means for contacting an intermediate portion of the frontmost one of said containers for preventing the containers from being dispensed until desired;

ejector means for selectively pushing the frontmost one of said containers over the top of said stop means, said ejector means including a member movable between a first position disposed under the frontmost container when the bottom of the frontmost container is in alignment with the other containers in the tray means, and a second position above the level of said stop means whereby said frontmost container will be delivered to a customer; and

said ejector means including a rod extending across a front portion of the tray means;

slot means disposed in the sidewalls of said tray means above said rod for receiving the ends of said rod and for guiding said rod as it is moved between the first and the second positions thereof;

cam means movable between a first position and a second position thereof for engaging at least one end of the rod for selectively controlling the movement of said rod between the first and the second position thereof, said cam means including at least one plate pivotally attached at one end thereof to said tray means and having a rod receiving slot disposed towards the other end thereof and having said rod disposed in said rod receiving slot; and

actuation means for selectively moving the cam means from the first position thereof to the second position and back to the first position thereof whereby the rod will also move from the first position to the second position thereof for ejecting the frontmost container and then back to the first position thereof for permitting a new container to assume the frontmost position overlying said rod.

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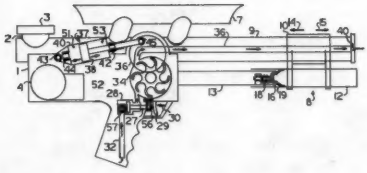
**4,591,071**

## SQUIRT GUN

**Lonnie G. Johnson, 1463 E. Barkley Dr., Mobile, Ala. 36606**

**Filed Oct. 14, 1983, Ser. No. 541,898**
**Int. Cl.[4] B67D *5/32***
**U.S. Cl. 222—39** **9 Claims**



8. A toy squirt gun comprising:

(a) a gun shaped container for holding water and air under pressure, including a barrel portion with a nozzle in its free end, and a passageway within said barrel communicating between said nozzle and the contents of said container;

(b) said container including an access port for filling said container with water;

(c) a removable cap for sealing said access port;

(d) said container including an air reservoir portion which extends upward beyond the height of said access port, said air reservoir being located such that air will be trapped therein when said container is filled with water;

(e) means operably coupled to said container for manually pressurizing the contents of said container, including:

a hollow piston portion mounted on said container and projecting therefrom, the hollow portion thereof communicating with contents of said container;

a check valve operably mounted in the free end of said piston for retaining air in said piston injected through said valve;

a hollow pressurization cylinder with one closed end, fitted on said piston like a sleeve for axial slidable movement, the inside diameter of said cylinder being slightly greater than the outside diameter of said piston to allow the entrance of air within said cylinder upon axial movement of said cylinder away from said container; and

flexible seal means mounted on the end of said piston between the walls of said piston and cylinder and adapted to allow one way movement of air into said cylinder when said cylinder is moved axially away from said container;

(f) a control valve operably mounted within said passageway for opening and closing said passageway, including a shaft

connected to said valve which projects externally of said container; and

(g) a trigger operably connected to said container and the externally projecting portion of said control valve shaft and adapted to open sid control valve upon manual activation thereof.

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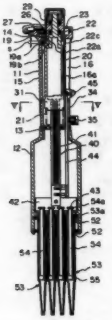
**4,591,072**

## REPEATING DISPENSER

**Yuji Oshikubo, Sakura, Japan, assignor to Nichiryo Co., Ltd., Tokyo**

**Filed Mar. 26, 1985, Ser. No. 716,038**
**Claims priority, application Japan, Mar. 27, 1984, 59-58891**
**Int. Cl.[4] B67D *5/22***
**U.S. Cl. 222—44** **3 Claims**



1. A dispenser for repeatedly dispensing uniform quantities of liquid comprising:

a tubular body consisting of integrally connected upper and lower body, said upper body having a bottom wall and said lower body having attachment means at its bottom end for releasably securing a cylinder piston device mounting thereon a plural sets of cylinder and pistons, said lower body having a generally rectangular cross section;

radially inwardly projecting means mounted near to the top end of the upper body and defining an upwardly facing abutment and a downwardly facing abutment;

an actuating button projecting upwards above the top end of the upper body and having at its bottom a plurality of circumferentially spaced axially stepped surfaces for selectively engaging against said upwardly facing abutment to define one of a plurality of different distances through which said button can be moved downward from its normal position;

an actuator non-rotatably and slidably received in the upper body and connected rotatably to said button, said actuator having an upwardly facing shoulder for engaging with said downwardly facing abutment;

a spring acting between the actuator and the bottom wall of the upper body for biasing upward the actuator;

a slide slidably received in the lower body and having means for releasably securing thereto pistons of said cylinder piston device;

a rack shaft secured to the slide to extend upward therefrom and having a plurality of rack teeth spaced along its length;

a pawl pivoted on said actuator and extending through an opening in said bottom wall of the upper body, said pawl being swingingly biased toward engagement with said rack teeth, said opening defines means preventing the pawl from engagement with said rack teeth in the normal position of the actuator;

an operating rod secured to the slide and extending upward therefrom through the bottom wall of the upper body and along one side surface of the upper body; and

an operating button secured to the upper end of the operating rod.

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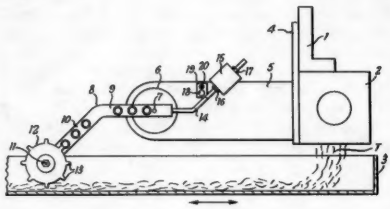
**4,591,073**

## APPARATUS FOR MONITORING PARTICULATE MATERIAL

**Robert G. W. Bryant, Totton, England, assignor to British-American Tobacco Company Limited, London, England**

**Continuation of Ser. No. 351,596, Feb. 23, 1982, abandoned.**
**This application Dec. 7, 1984, Ser. No. 663,886**
**Claims priority, application United Kingdom, Mar. 3, 1981, 8106653**
**Int. Cl.[4] B67D *5/08;* B65G *43/00***
**U.S. Cl. 222—55** **1 Claim**



1. Apparatus, mounted in a cigarette-making machine comprising a tobacco-feed hopper, for monitoring the amount of tobacco returns material being conveyed in a stream thereof, on a returns conveyor, comprising a freely rotatory material-contacting means, means for mounting said contacting means so that it extends across the stream of material in contact with the surface thereof and is free to rise and fall in accordance with changes in the depth of the stream, and detection means operable to detect movement of said contacting means caused by such changes, which detection means is also operable to generate a signal indicative of the amount of tobacco being conveyed by said conveyor, said contacting means comprising projections extending transversely of the direction of the said stream, whereby the movement of the stream causes the contacting means to rotate and whereby said contacting means closely follows undulations of said surface, said feed hopper being responsive to said signal from said detection means to vary the feed rate of tobacco.

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**4,591,074**

## CAPLESS CONTAINER

**Kenneth L. Kennings, Rte. 2, Box 83-4, Strafford, Mo. 65757**

**Filed Feb. 15, 1983, Ser. No. 466,536**
**Int. Cl.[4] B65D *83/04***
**U.S. Cl. 222—153** **11 Claims**

1. A container comprising an outer element and an inner element, said outer element having a bore for receiving said inner element for axial slidable movement therein and said inner element having a chamber for receiving articles and an opening for dispensing said articles, and control means for controlling the relative positions of said inner and outer elements, said control means comprising resilient means for biasing said inner element in a first direction to an open position wherein said opening is exposed and holding means for holding said inner element against the bias of said resilient means in a closed position wherein said opening is blocked by said outer element, wherein said holding means comprises means for releasing said inner element from said closed position when said inner element is pushed against the bias of said resilient

means in a second direction opposite said first direction from said closed position and for again holding said inner element in

said closed position when said inner element is subsequently pushed in said second direction from said open position.

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**4,591,075**

## ACTIVATOR FOR FLUIDIZING SLOW-MOVING MATERIAL IN CONTAINERS

**Hans E. Eriksson, Rönninge, Sweden, assignor to Norvale AB, Bandhagen, Sweden**

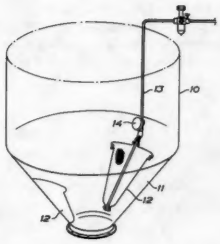
**PCT No. PCT/SE83/00103, § 371 Date Dec. 1, 1983, § 102(e) Date Dec. 1, 1983, PCT Pub. No. WO83/03401, PCT Pub. Date Oct. 13, 1983**

**PCT Filed Mar. 25, 1983, Ser. No. 567,864**

**Claims priority, application Sweden, Apr. 1, 1982, 8202101-5**

**Int. Cl.[4] B65G *69/06***

**U.S. Cl. 222—195** **9 Claims**



**1.** Activator for fluidizing slow-moving material in containers **(10)**, comprising a flat element **(15)** to be applied against the inside surface of the container wall and having a space defined between a front layer and a rear layer, which is closed at the margins of the element and has a connection **(17, 30)** for the supply of pressurized gas pulses to the space, the front layer intended to face the interior of the container, being gas-permeable and being movable in relation to the rear layer so as to allow transmission of pressurized gas pulses when supplied, to the material in the container, a rhythmical movement of the front layer in relation to the rear layer simultaneously being obtained in pace with the pressurized gas pulses, characterized in that the two layers are arranged as a flat activator hose **(15)** which is loosely suspended on a support member **(16)** with the connection for the supply of pressurized gas pulses arranged as a conduit **(17, 30)** projecting into the activator hose between the layers thereof with the conduit **(17, 30)** comprising a socket **(17)** arranged substantially centrally on the support member **(16)** and with said support member comprising a yoke **(16)** extending transversely of the socket **(17)**, said yoke being curved or angled at each side of the socket and terminating at free ends.

**4,591,076**

## MANUAL LIQUID DISPENSER

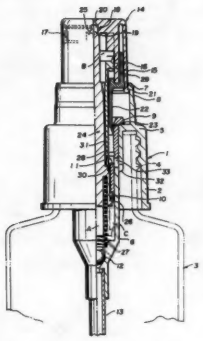
**Shigeo Iizuka, Tokyo, Japan, assignor to Yoshino Kogyosho Co., Ltd., Tokyo, Japan**

**Filed May 22, 1984, Ser. No. 612,899**

**Claims priority, application Japan, May 24, 1983, 58-78830[U]**

**Int. Cl.[4] B05B *9/00***

**U.S. Cl. 222—321** **3 Claims**



**1.** A manual liquid dispenser comprising:

a mounting member engaged fixedly with a guide cylinder from the inner surface of the upper end thereof, said guide cylinder having a bore of a lower part thereof smaller than a bore of an upper part thereof, said guide cylinder extending from a container neck portion toward the body of the container, said mounting member having a small-diameter cylinder mounted within the interior of the neck portion, said mounting member further including a first engaging cylinder extending upwardly therefrom,

a suction valve internally mounted in an opened bottom of said small-diameter cylinder,

a sucking tube connected to said suction valve and extending to the bottom of the container,

a spraying head capable of being depressed and formed with a valve seat of a discharge valve and a valve port at the center thereof on an inside surface thereof, having a second engaging cylinder slidably contacted with the inner periphery of the first engaging cylinder said spraying head further including a large-diameter cylinder of a bore larger than the bore of the small-diameter cylinder disposed at the inside of the second engaging cylinder, and a nozzle port opened to communicate with the valve port which is opened at one side thereof,

a rod member slidably contacted at a lower large-diameter part thereof with the inner surface of the guide cylinder and extending upwardly, formed with a valve body of the discharge valve at the upper end of a small-diameter part of an upper part thereof, and formed with a slot communicating with both said small-diameter and said large-diameter cylinders on the outer surface of a lower large-diameter part thereof and an intermediate middle-diameter part thereof, respectively,

a returning coiled spring for upwardly urging said spraying head through said rod member and seating the valve body on the valve seat to close the discharge valve, and

a tubular member engaged with the outer surface of the intermediate middle-diameter part of said rod member so that a first cylindrical piston formed at the upper end thereof is slidably engaged with the inner periphery of the large-diameter cylinder and a second cylindrical piston formed at the lower end thereof is slidably engaged with the inner periphery of the guide cylinder,

wherein, when said spraying head is depressed in order to

spray the liquid in the container, a pressure chamber is formed between the outer surface of the lower large-diameter part of said rod member and the inner surface of the lower smaller bore part of said small-diameter cylinder.

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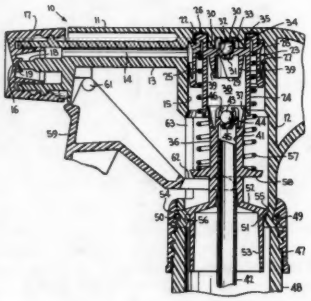
**4,591,077**

**CONTINUOUS DISCHARGE DISPENSER**

**Douglas F. Corsette, 6559 Firebrand St., Los Angeles, Calif. 90045**

**Filed Jan. 28, 1985, Ser. No. 695,281**
**Int. Cl.[4] B05B *11/00***
**U.S. Cl. 222—321** **19 Claims**



1. A dispenser comprising:

a pump body having an inwardly directed blind socket at one end;

means at the other end of said pump body for securing same in fluid tight communication with the opening of a container of flowable product to be dispensed;

an accumulator slidably disposed in said body and defining a variable volume pressure accumulation chamber with said blind socket;

a plunger having a piston portion slidably disposed in said accumulator and therewith defining a variable volume pump chamber in communication with said accumulation chamber which receives pressurized product from said pump chamber;

a discharge passage opening outwardly from said accumulation chamber;

said accumulator having an outlet valve thereon for opening said passage upon movement of said accumulator in one direction in response to an accumulation of pressure in said accumulation chamber, said outlet valve closing said passage upon movement of said accumulator in an opposite direction;

means on said accumulator defining a check valve controlled inlet from said pump chamber and for blocking return flow to said pump chamber, whereby the dispensing of product upon said opening of said passage continues so long as the pressure in said accumulation chamber maintains said outlet valve open;

said plunger having a check valve controlled inlet passage therethrough for establishing communication between said pump chamber and the container of flowable product to be dispensed;

resilient means urging said accumulator for movement in said opposite direction; and

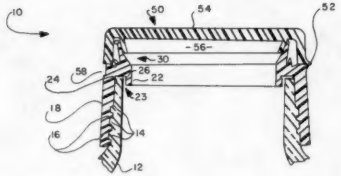
means for actuating said plunger, independently of the movement of said accumulator, between piston pressure and intake strokes.

**4,591,078**

**DRIPLESS POURING CAP**

**Neal V. Weissman, New York, N.Y., assignor to Colgate-Palmolive Company, New York, N.Y.**

**Filed Dec. 29, 1983, Ser. No. 566,915**
**Int. Cl.[4] B65D *25/48***
**U.S. Cl. 222—517** **19 Claims**



1. A dripless pouring cap for dispensing liquids from a container, comprising:

attaching means for sealingly coupling said dripless pouring cap to a container; said attaching means is provided with a horizontal surface;

an outwardly diverging pouring spout extending upwardly from a base coupled to said attaching means having interior and exterior walls, said pouring spout is provided with a rim having a drip preventing pouring portion that projects outwardly from said pouring spout and over which liquid is poured during dispensing,

a first drip catching basin is formed at the base of the exterior wall of said pouring spout directly beneath the drip preventing pouring portion; and

a closure means for sealing said pouring spout, said closure means is pivotally coupled to said attaching means by a hinge means and is provided with an inwardly converging interior skirt that makes sealing contact with the outwardly diverging interior wall of said pouring spout.

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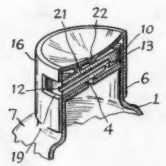
**4,591,079**

**CONTAINER CAP WITH SELF-RETRACTING SPOUT**

**Georges Bigotte, 11, Quai Paul Doumer, 92400 Courbevoie, France**

**Filed Jul. 6, 1984, Ser. No. 628,560**
**Claims priority, application France, Jul. 8, 1983, 83 11456**
**Int. Cl.[4] B65D *47/10***
**U.S. Cl. 222—538** **5 Claims**



1. A closing cap with a self-retracting spout, for use with a container, said cap comprising:

a cylindrical cap body having in its top a central keyway diametrically crossing said top and of rectangular section, one end of said keyway being closed off and the cap body having a center opening;

a spout having a vertical drive pin, said spout comprising a flow channel and being operable to slide in said central keyway;

said spout being shaped as a rectangular prism the two ends thereof being rounded and the sides thereof being provided with guiding means, said spout containing an internal channel consisting of two sections, one section going

longitudinally through the prism from the front to the second section perpendicular thereto and located at the back of said spout and terminating at the bottom face of said spout;

and a revolving cover having a window, and a specially configured guiding ramp located towards the front of said cover, said ramp cooperating with said drive pin of the spout in the central keyway as said cover is rotated;

said cover and said cap body having catching means for locking the cover onto the cap body, and the flow channel of said spout being so designed that the inlet to the channel aligns with the outlet from a container when in use position;

wherein the back of said spout is hollowed out to form a leaf spring.

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**4,591,080**

## ROTARY NOZZLE SYSTEM FOR METALLURGICAL VESSELS

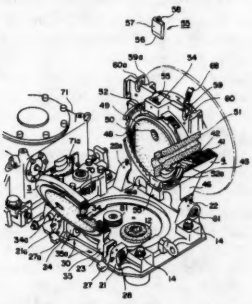
**Tetsuya Yoshihara, Yokohama, Japan, assignor to Nippon Kokan Kabushiki Kaisha, Tokyo; Nippon Rotary Nozzle Co., Ltd.; Kokan Kikai Kogyo Kabushiki Kaisha, both of Kawasaki and Tokyo Yogyo Kabushiki Kaisha, Tokyo, all of, Japan**

**Filed Dec. 13, 1983, Ser. No. 560,997**

**Claims priority, application Japan, Dec. 14, 1982, 57-217684; Dec. 14, 1982, 57-217685; Dec. 14, 1982, 57-187929; Dec. 27, 1982, 57-227108; Dec. 27, 1982, 57-195382[U]; Dec. 27, 1982, 57-195383[U]; Dec. 27, 1982, 57-195384[U]; Feb. 25, 1983, 58-29551**

**Int. Cl.⁴ B22D** *41/08*

**U.S. Cl. 222—598** **15 Claims**



**11.** A dual door type rotary nozzle system for a metallurgical vessel, comprising:

a base member positioned below the bottom shell of said vessel;

an inner door including a bottom plate brick having a plurality of nozzle bores, a support case maintaining therein said bottom plate brick in a relatively non-rotatable manner, a door frame surrounding said support case, first bearing means for rotatably supporting said support case within said door frame so as to manually rotate said bottom plate brick along with said support case when said inner door is opened, and first hinge means for pivotably connecting said door frame with said base member;

an outer door including a slide plate brick coacting with said bottom plate brick, a rotor maintaining therein said slide plate brick in a relatively nonrotatable manner and provided with a gear on the outer periphery thereof, frame means rotatably supporting said rotor by means of second bearing means, pressure means arranged within said frame means and exerting forces upon the lower surface of said rotor for pressing said slide plate brick toward said bottom plate brick, and second hinge means for pivotably connecting said frame means with said base member, wherein said base member is formed with an opening for receiving a lower part of a top nozzle and includes a projection arranged at a position corresponding to an unused nozzle bore of said bottom plate brick, said bottom plate brick including a recess corresponding in shape with and adapted to receive said projection so as to be borne against said bottom plate brick to prevent rotation of said support case relative to said inner door frame when said inner door is closed.

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**4,591,081**

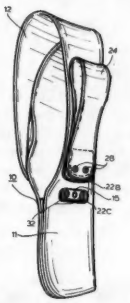
## AMBIDEXTROUS HOLSTER

**John E. Bianchi, and Richard D. E. Nichols, both of Fallbrook, Calif., assignors to Bianchi Intl. Inc., Temecula, Calif.**

**Filed Jan. 30, 1984, Ser. No. 575,313**

**Int. Cl.⁴ F41C** *33/02*

**U.S. Cl. 224—192** **11 Claims**



**1.** An ambidextrous holster comprising:

a body of material formed to define a pocket for holding a handgun with an opening for the entrance and exit of the handgun;

a separable flap for securement to said holster to cover at least part of said opening;

said flap and holster body including first fastener means including a pair of fastener parts, one part on the flap and the other part on the holster body, said first fastener means being normally openable and closable by the user during normal introduction and removal of the handgun from the holster;

second fastener means on said holster comprising a pair of fastener parts, one secured to the holster body;

belt loop means securable to the exterior of said flap by said second fastener means;

whereby securement of said second fastener means parts together secures said belt loop means and flap to said holster body.

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**4,591,082**

## OPTICAL FIBER SEVERING DEVICE AND METHOD

**Malcolm H. Hodge, Simsbury, Conn., assignor to TRW Inc., Redondo Beach, Calif.**

**Filed Nov. 7, 1983, Ser. No. 548,964**

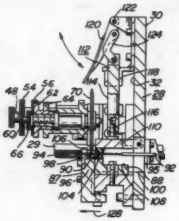
**The portion of the term of this patent subsequent to Mar. 5, 2002, has been disclaimed.**

**Int. Cl.⁴ C03B** *37/16*

**U.S. Cl. 225—2** **33 Claims**

**1.** An optical fiber severing device comprising support means for retaining a plurality of optical glass fibers in spaced relationship, scoring means for inflicting a flaw on the glass surface of each of the optical fibers providing each of the fibers with first and second portions on opposite sides of its flaw, pressure means for slidably engaging each of the fibers and applying pressure to a contacted area of each of the fibers, and motive means for applying respective tension forces between

the first portions of the fiber and the pressure means and concurrently moving each of the fibers with respect to the pressure means so that the contacted areas pass over the flaws as they move along the surfaces of the fibers from the first portions to the second portions, the pressure means producing frictional forces with the relative motion of the fibers at the respective contacted areas along each of the fiber surfaces in the direction opposing the motion, the frictional forces respec-



tively applied to the first portions of each of the fibers decreasing as each contacted area passes over its flaw while the frictional forces respectively applied to the second portions of each of the fibers correspondingly increase in opposition to the tension forces applied to the first portions of the fibers, the frictional forces respectively applied to the second portions of the fibers each increasing until sufficient to sever its fiber at the flaw.

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**4,591,083**

## THREADING ARRANGEMENT FOR STRIP-SHAPED MATERIAL

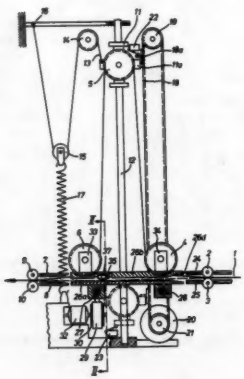
**Günter Heidrich, and Bernd Payrhammer, both of Munich, Fed. Rep. of Germany, assignors to Agfa-Gevaert AG, Leverkusen, Fed. Rep. of Germany**

**Filed Oct. 22, 1984, Ser. No. 663,993**

**Claims priority, application Fed. Rep. of Germany, Nov. 2, 1983, 3339618**

**Int. Cl.[4] G03B *1/56***

**U.S. Cl. 226—91** **15 Claims**



1. A threading arrangement for a strip-like material with a timely overlapping of gaps of guidance for the material after a supply device for example at treatment locations particularly at treatment devices for band-shaped photographic layer carrier, the arrangement comprising overlapping means formed as a guiding rail to guide the material both flat sides and the material side edge, said guiding rail having a guiding surface for the side edge, said guiding rail with said guiding surface being movable in a plane of the material and transverse to a transporting direction of the material to an overlapping position for threading the material, and after threading from said overlapping position to a working position.

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**4,591,084**

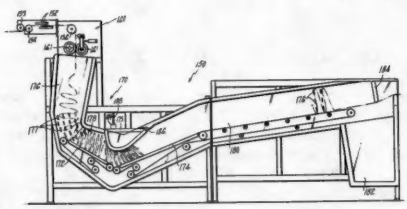
## METHOD AND APPARATUS FOR FEEDING AND ACCUMULATING RIBBON MATERIAL

**Basil A. Balian, Fort Wayne, and Charles R. Busch, Auburn, both of Ind., assignors to Essex Group, Inc., Fort Wayne, Ind.**

**Filed Jun. 4, 1984, Ser. No. 617,309**

**Int. Cl.[4] B65H *17/42***

**U.S. Cl. 226—118** **10 Claims**



1. Apparatus for accumulating and feeding a paper ribbon which comprises:

a feed chute for receiving ribbon and wherein the ribbon stacks into a zig-zag folded pile;

feed means for supplying ribbon to the feed chute;

a stacking area including a ramp conveyor for moving the continuous zig-zag folded pile towards a storage area, said pile having a forward lean;

a storage area including a storage conveyor for receiving the pile from the stacking area, said storage area being sufficiently large to store the desired amount of ribbon in a zig-zag folded pile;

reversing means extending downwardly to engage only the top portion of the pile as it travels along the conveyors, said reversing means engaging the top portion of the forward leaning pile while the ramp conveyor and storage conveyor are advancing the bottom of the pile to effectively create a backward leaning pile in the storage area such that as the ribbon is removed from the storage area it is removed from the top of the pile; and

said reversing means is a rounded structure adjustably mounted to regulate the extent the reversing means extends downwardly which regulates the amount of contact with the pile such that the direction of lean of the pile may be reversed without applying unnecessary resistance to the pile, said reversing means being sufficiently spaced from the conveyors to allow the zig-zag folded pile to be conveyed therebetween with the pile oriented in a substantially upright manner.

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**4,591,085**

## SURGICAL INSTRUMENT FOR APPLYING FASTENERS, SAID INSTRUMENT HAVING AN IMPROVED TRIGGER INTERLOCKING MECHANISM (CASE VI)

**John Di Giovanni, Woodbridge, N.J., assignor to Ethicon, Inc., Somerville, N.J.**

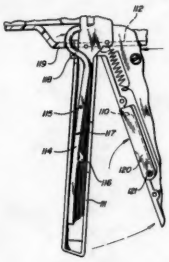
**Filed Jul. 16, 1984, Ser. No. 631,116**

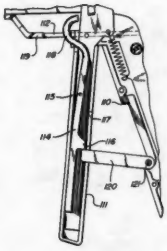
**Int. Cl.[4] A61H *17/00***

**U.S. Cl. 227—8** **3 Claims**

1. A surgical instrument for stitching tissue by means of staples said instrument comprising: a support body, a pair of jaws mounted at one end of said support body, a staple housing mounted in one of said jaws, means mounted on said support body for moving said jaw containing said staple housing towards the other jaw to close the gap and clamp tissue placed

therebetween, drive means mounted on said support body for driving the staples from the jaw on which the staple housing is mounted towards the opposite jaw, actuating means mounted at the end of said support body opposite said end on which the jaws are mounted for actuating said staple drive means, said actuating means comprising a stationary grip portion and a movable trigger portion, and means for preventing the actuation of said movable trigger portion until an appropriate gap is





set between the jaws, said preventing means comprising a first pivotal lever mounted on said movable trigger portion, a second pivotal lever mounted on said stationary grip portion, said levers interlocking with each other to prevent movement of said movable trigger portion and means mounted on said support body for automatically pivoting said first pivotal lever out of interlocking relationship with said second pivotal lever when an appropriate gap has been set between the jaws of the instrument.

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**4,591,086**

## SURGICAL STAPLING INSTRUMENT

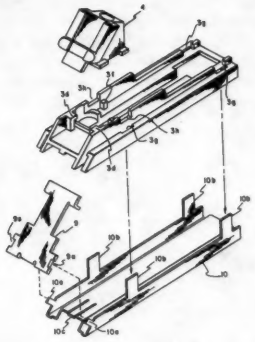
**Jay E. Campbell, Upper Black Eddy; Richard H. Reichmann, Churchville, both of Pa., and Lehmann K. Li, Fairfield, Conn., assignors to American Cyanamid Company, Stamford, Conn.**

**Continuation of Ser. No. 191,654, Sep. 26, 1980, Pat. No. 4,406,392, which is a continuation-in-part of Ser. No. 153,228, May 27, 1980, abandoned. This application Jan. 19, 1983, Ser. No. 459,081**

**Int. Cl.[4] A61H** *12/00*

**U.S. Cl. 227—19** **3 Claims**

1. A surgical stapling instrument comprising: a handle; a movable trigger mounted on said handle; means connected to said handle for driving and forming a staple, said means comprising a movable forming and driving blade and a staple forming anvil; means for carrying a plurality of staples and presenting them to said forming blade to be driven and formed, said carrying means comprising a one piece track; a plurality of staples carried on said track with the proximal staple of said plurality being adjacent said anvil; the improvement comprising a leaf spring which is a unitary part of said track and positioned at the end of said track adjacent said anvil whereby said



proximal staple is biased away from said anvil by said leaf spring.

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**4,591,087**

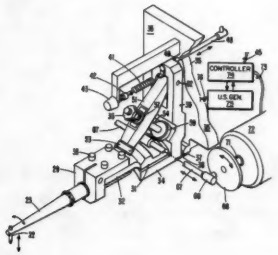
## APPARATUS FOR MAKING ROLLING SPOT BONDS

**Eugene W. Frasch, Warminster, Pa., assignor to Kulicke and Soffa Industries Inc., Horsham, Pa.**

**Filed Mar. 7, 1984, Ser. No. 587,225**

**Int. Cl.[4] B23K** *1/06*

**U.S. Cl. 228—110** **14 Claims**




1. Apparatus for ultrasonically spot bonding conductive fingers of a preformed connector to a substrate device, comprising:

a bonding machine frame,

a work station on said frame,

said substrate device having a plurality of terminal connection pads thereon mounted on said work station,

said preformed connector having a plurality of said conductive fingers positioned juxtaposed said terminal connection pads for being bonded thereto,

an ultrasonic transducer having a longitudinal axis,

means for mounting said ultrasonic transducer on said frame to provide arcuate pivotal movement transverse to said longitudinal axis of said transducer having an inner race and an outer race with bearings between said races,

outer cam surfaces on said outer race,

cam follower means engaging said outer cam surfaces,

said cam follower means being coupled to said inner race and exerting a clamping force on said bearings,

a wedge bonding tool mounted in said ultrasonic transducer,

a convex shaped working face on the free end of said wedge bonding tool formed as a segment of a cylinder,

a pivot point on said convex shaped working face of said wedge bonding tool,

means for engaging said working face of said wedge bonding tool with one of said conductive fingers to be bonded to said substrate device, and

means for moving the longitudinal axis of said ultrasonic transducer through an arcuate path to pivot said wedge bonding tool on its said pivot point and to provide a rolling spot bond of said conductive fingers to said substrate device.

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**4,591,088**

## SOLDER REFLOW PROCESS FOR SOLDERING SHAPED ARTICLES TOGETHER

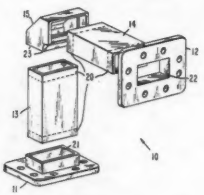
**Richard R. Mulliner, and James S. Ajioka, both of Fullerton, Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Division of Ser. No. 499,746, May 31, 1983, Pat. No. 4,499,157. This application Oct. 31, 1984, Ser. No. 666,952**

**The portion of the term of this patent subsequent to Jan. 22, 2002, has been disclaimed.**

**Int. Cl.[4] B23K *1/00***

**U.S. Cl. 228—121** **43 Claims**



1. A solder reflow process for forming an integrated assembly of mutually supportive articles soldered together wherein at least one article comprises a metal plated plastic material, the process comprising the steps of:

a. providing a metal plated plastic article comprising a plastic having a coefficient of thermal expansion compatible with the article to which the plastic article is to be soldered, and formed by a process comprising the steps of:

i. selecting a plastic having a deflection temperature and a melting temperature of at least 204° C. and having a predetermined amount of glass fill;

ii. forming the plastic into the article shape;

iii. roughening the surface of the article by means of physical abrasion;

iv. exposing the roughened surface of the formed article to a chemical etch solution comprising ammonium bifluoride, nitric acid, and sulfuric acid;

v. chemically depositing a first layer of conductive metal on the chemically etched surface of the article; and

vi. electrolytically depositing a second layer of metal on the first layer of conductive metal;

b. drying the plated plastic article;

c. assembling the articles together;

d. applying flux to the articles;

e. applying solder to the articles; and

f. immersing the assembled articles in the heat medium for a time period which is long enough to permit complete solder reflow.

**4,591,089**

## METHOD OF MAKING A COMPOSITE FORGED-METAL ARTICLE

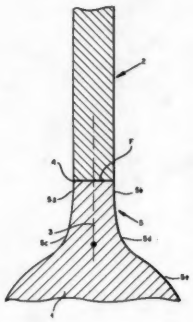
**Rütger Berchem, Gelsenkirchen, Fed. Rep. of Germany, assignor to Berchem & Schbaerg GmbH, Gelsenkirchen, Fed. Rep. of Germany**

**Filed Sep. 17, 1984, Ser. No. 651,671**

**Claims priority, application Fed. Rep. of Germany, Sep. 20, 1983, 3333913**

**Int. Cl.[4] B23K *31/00***

**U.S. Cl. 228—167** **6 Claims**



1. A method of making a composite metal article which comprises the steps of:

die forging a metal body between a pair of dies while pressing material from said body between said dies to form a flash fin on said body; and

welding a plate to said fin in substantially coplanarity therewith.

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**4,591,090**

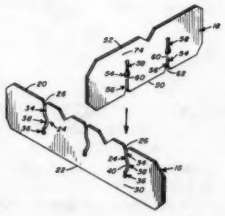
## CARTON DIVIDER WITH PARTITION INTERLOCK

**Thomas D. Collins, Kennesaw, and Glenn D. Ross, Smyrna, both of Ga., assignors to Sonoco Products Company, Hartsville, S.C.**

**Filed Jul. 26, 1985, Ser. No. 759,214**

**Int. Cl.[4] B65D *5/48***

**U.S. Cl. 229—15** **11 Claims**



1. In a carton divider defined by at least one generally planar partition and one generally planar cross-partition, each partition and cross-partition having first and second edges, with a locking slot extending inward from an open outer end at the first edge thereof and terminating at a closed inner end intermediate said edges, each said partition and cross-partition including a surface portion aligned with the corresponding slot and extending from the closed end thereof to the corresponding second edge, the slots and aligned surface portions being cooperatively interengageable for interlocking said partition and cross-partition into a cell-defining configuration; the slot in said partition having opposed generally parallel side edges

between the open and closed ends thereof spaced apart a distance greater than the thickness of said cross-partition at said slot aligned surface portion thereof, said partition slot having elongate inner and outer portions in substantial linear alignment and extending respectively from the open and closed ends of the partition slot, said partition slot including an intermediate portion between and directly communicating said inner and outer portions, said intermediate portion extending laterally relative to the linear alignment of the inner and outer portions and forming a tab defined by one of said side edges and projecting from one side of said slot laterally beyond the linearly aligned inner and outer portions, a selected section of said partition slot, in said inner portion and outward of the closed inner end thereof, being narrower than the remainder of said partition slot inner portion and defining a pinch area for intimate confinement of the cross-partition therein; the slot in said cross-partition having opposed generally parallel side edges between the open and closed ends thereof spaced apart a distance greater than the thickness of said partition at said slot aligned surface portion thereof, said cross-partition slot having elongate inner and outer portions in substantially linear alignment and extending respectively from the open and closed ends of the cross-partition slot, and an intermediate surface section intermediate the inner and outer portions of the slot of the cross-partition defining a cross bar, said cross bar, upon an interengaging of said slots, engaging against the closed inner end of the partition slot inward of the laterally directed tab and within said pinch area of said partition slot, a selected section of said cross-partition slot, in the elongate inner portion and outward of the closed inner end thereof, being narrower than the remainder of said cross-partition slot inner portion and defining a pinch area for intimate confinement of the partition therein for engagement of the laterally directed tab therethrough and therebeyond upon interengaging of said slots.

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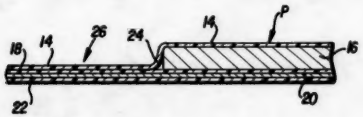
**4,591,091**

## ASEPTIC CONTAINER WITH TAMPER-RESISTANT SPOUT AND BLANK THEREFOR

**Daniel J. Wise, Columbus, Ohio, assignor to Combibloc, Inc., Columbus, Ohio**

**Filed Jul. 27, 1984, Ser. No. 635,192**
**Int. Cl.[4] B65D *5/72***
**U.S. Cl. 229—17 G** **19 Claims**




1. A paperboard container for fluent contents formed of a multilayer laminate material having a paperboard layer and a metal foil layer, said container comprising:

a bottom, a top and four side walls formed in the shape of a parallelepiped;

a sealed seam formed along the top of said container, at least one end of said seam being foldable onto one of said sidewalls of said container;

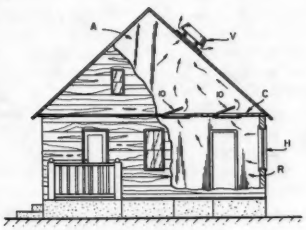
a panel extending from said one side wall, said panel having a geometrically-shaped weakened portion comprising an opening disposed only in the paperboard layer of said laminate material, the foil layer of said multilayer laminate material confronting and surrounding the opening being intact and imperforate, said weakened portion being covered when said seam is folded onto said one side wall.

**4,591,092**

## ENERGY SAVER DAMPER ASSEMBLY

**Stanley Kolt, Mamaroneck, N.Y., assignor to Leonard W. Surloff, Jericho, N.Y., a part interest**

**Division of Ser. No. 505,789, Jun. 20, 1983, Pat. No. 4,520,959.**
**This application Mar. 12, 1985, Ser. No. 710,965**
**Int. Cl.[4] F24F *13/10***
**U.S. Cl. 236—49** **10 Claims**




9. An energy saving system comprising:

(a) an automatic temperature responsive vent disposed in the ceiling of a room having a confined air space thereabove, said vent being provided with;

(i) an air passage therethrough,

(ii) flap means being movable from a closed position to an open position, said flap means being normally in said closed position,

(iii) grille means disposed across said air passage, and

(iv) adjustment means slideably affixed to said grille means for selectively preventing said flap means from reaching said closed position; and

(b) venting means disposed in one of the confining element means of said confined air space for venting said air into the outside atmosphere, one of said confining elements means being adjacent to said automatic vent for receiving air flowing through said air passage, said venting means causing said air to exit said confined air space and open said automatic vent flap to rapidly equalize the air pressure between said room and said outside atmosphere when said outside atmosphere decreases.

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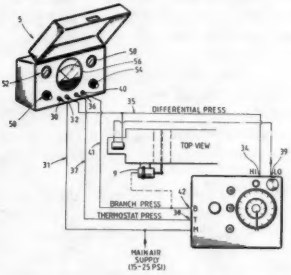
**4,591,093**

## CALIBRATION APPARATUS FOR AIR FLOW CONTROLLERS

**Alton M. Elliott, Jr., Pearland, Tex., assignor to E-Zee Company, Pearland, Tex.**

**Filed Jul. 2, 1985, Ser. No. 751,285**
**Int. Cl.[4] G05D *23/00***
**U.S. Cl. 236—94** **16 Claims**




1. Apparatus for calibrating a pneumatically controlled HVAC system of ducts, wherein a pneumatic controller hav-

ing multiple air fittings receives air through a first said fitting from a source of high pressure air and separately receives a first pneumatic signal through a second said fitting from a thermostat and a second pneumatic signal through a third said fitting reflecting the rate of air flow in a duct in said system to generate a third pneumatic signal operable through a fourth said fitting to actuate a damper positioner for a damper in said duct, which comprises in combination:

separate first and second air pressure regulators adapted to receive air from said source of high pressure air;

said first regulator connectable to said second fitting to supply a simulated said first pneumatic signal to said controller in place of said first pneumatic signal from said thermostat;

said second regulator connectable to said third fitting to supply a simulated said second pneumatic signal to said controller in place of said second pneumatic signal; and

a first pressure sensor adapted to indicate the magnitude of said third pneumatic signal generated by said controller in response to said simulated first and second pneumatic signals.

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**4,591,094**

## FOUNTAIN

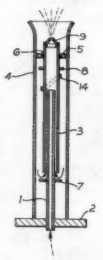
**Arthur Morris, 1 E. Row, Whinneybanks, Middlesbrough, United Kingdom**

**Filed Aug. 13, 1984, Ser. No. 640,391**

**Claims priority, application United Kingdom, Aug. 13, 1983, 8321864; Dec. 9, 1983, 8332864**

**Int. Cl.⁴ B05B** *17/08, 15/10;* **F21P** *7/00*

**U.S. Cl. 239—17** **4 Claims**




1. In a fountain comprising:

(a) a generally vertical, elongated fluid inlet tube;

(b) a spray tube means coaxially surrounding said fluid inlet tube and mounted so as to be linearly freely movable in the direction of the length of said fluid inlet tube;

(c) said spray tube further being open at its lower end and defining, between said lower end and said fluid inlet tube, a generally annular aperture for admission to said spray tube means of a liquid to be sprayed;

(d) at least one flow-restricting orifice disposed at a upper end of said spray tube to restrict a flow of liquid from said spray tube;

(e) a liquid container surrounding said spray tube to supply liquid to said spray tube through the generally annular aperture; and

(g) a fluid pump to pump fluid into said fluid inlet tube; whereby, during operation of said fountain, fluid pressure between said fluid inlet tube and said upper end of said spray tube means causes said liquid to be drawn into said generally annular aperture for subsequent ejection from said at least one orifice, and further wherein said fluid pressure causes said linear movement of said spray tube means.

**4,591,095**

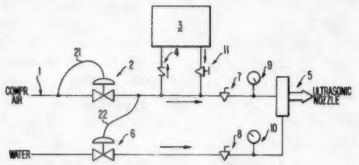
## SINGLE-PRESSURE ACTUATED CONTROL SYSTEM FOR COMPRESSED AIR SPRAYING OF WATER

**Joseph T. Fama, 1701 Briggs Chaney Rd., Silver Spring, Md. 20904, assignor to Joseph T. Fama, Silver Spring, Md.**

**Filed Jun. 8, 1984, Ser. No. 618,552**

**Int. Cl.⁴ B05B** *3/14;* **F16K** *24/00*

**U.S. Cl. 239—102** **10 Claims**




1. A control system for spraying water from a nozzle with compressed air, comprising

a first valve connected to and operated by a supply of compressed air,

means for opening said first valve to pass said air when the pressure of said supply is sufficiently high and for closing said first valve when the pressure is sufficiently low,

a tank connected to receive the air passed by said first valve,

a second valve connected to a supply of water and controlled by the pressure of the air passed by said first valve,

means for opening said second valve when the pressure of said passed air rises sufficiently high and for closing said second valve when the pressure of said passed air falls sufficiently low,

a nozzle connected to receive the air and water passed by said first and second valves, and

means for continuing to supply air for a period of time to said nozzle from said tank after both said valves are closed, to remove at least a part of the water downstream of said second valve to prevent water from dripping from said nozzle.

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**4,591,096**

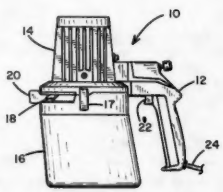
## CENTRIFUGAL SPRAYER HAVING INTERCHANGEABLE FEED MECHANISM

**Irving F. Snyder, Blaine; William D. Vork, Edina, and Michael Itzin, Brooklyn Park, all of Minn., assignors to Polaris Home Systems, Inc., Minneapolis, Minn.**

**Filed Dec. 27, 1983, Ser. No. 565,400**

**Int. Cl.⁴ F23D** *11/04;* **B05B** *3/02*

**U.S. Cl. 239—216** **5 Claims**




1. A centrifugal sprayer of the type having a disc member attached to a rotatable drive member proximate the top of a liquid container which is itself attachable to a housing enclosing the rotatable drive member, comprising

(a) A hollow cone member attached to said disc and to said rotatable drive member, said cone member having an opening proximate the bottom of said container;

(b) A funnel-shaped housing supported inside said container and having a portion thereof encircling said cone member;

(c) Said cone member and housing having, respectively, first

and second tubular sections, and a bushing sleeve fitted between said tubular sections and sized to permit free rotation of the cone within the housing and to guide the cone in stable rotational operation within the housing.

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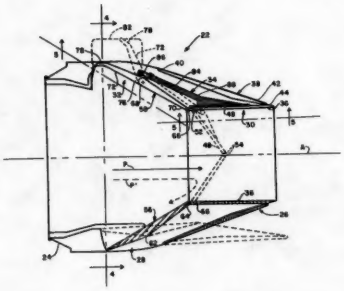
**4,591,097**

## THRUST REVERSER/EXHAUST NOZZLE ASSEMBLY FOR A GAS TURBINE ENGINE

**Edward B. Thayer, Jupiter, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed May 16, 1984, Ser. No. 611,041**
**Int. Cl.[4] B64C *15/00***
**U.S. Cl. 239—265.29** **6 Claims**



1. An improved thrust reverser/exhaust nozzle assembly for a gas turbine engine having a central axis, comprising:

(a) a gas turbine engine exhaust case structure;

(b) divergent nozzle means mounted on said case structure for movement between a closed position wherein a first downstream exhaust gas flow path having a minimum exit area is defined and an open position wherein a second downstream exhaust gas flow path having a maximum exit area is defined, said divergent nozzle means including a first plurality of divergent flaps and divergent seals extending along and circumferentially disposed about said engine axis, each of said divergent flaps and divergent seals having upstream and downstream ends, each of said divergent seals having a cutout therethrough;

(c) convergent nozzle means axially displaced upstream of said divergent nozzle means and mounted on said case structure for movement between contracted and expanded positions, said convergent nozzle means including:

a second plurality of one-piece convergent flaps extending along said engine axis and circumferentially spaced apart from one another about said engine axis, said one-piece flaps having respective upstream and downstream ends and being pivotally mounted at their respective midsections to said case structure and at their respective downstream ends to the respective upstream ends of a corresponding second plurality of said divergent flaps; and

a third plurality of articulated convergent flaps extending along said engine axis and disposed about said engine axis in circumferentially spaced apart relationship to one another and alternately with said one-piece convergent flaps, said articulated flaps having respective upstream and downstream ends and being pivotally mounted at their respective upstream ends to said case structure and at their respective downstream ends to the respective upstream ends of a corresponding third plurality of said divergent flaps;

(d) gas flow blocker means mounted on said divergent nozzle means for movement between a deployed position wherein gas flow is redirected from said first downstream path outwardly and into an upstream path and a stowed position wherein downstream gas flow through said divergent nozzle means is unobstructed by said blocker means, said gas flow blocker means including a plurality of blocker devices, each blocker device having an upstream and downstream end and being pivotally mounted at its upstream end to one of said divergent seals adjacent the upstream end thereof, said blocker device fitting within and closing said cutout of said one divergent seals when disposed in said stowed position and extending through said cutout and coacting with blocker devices of adjacent seals when disposed in said deployed position to substantially obstruct and prevent downstream gas flow through said divergent nozzle means;

(e) gas flow deflector means axially displaced upstream of said blocker means and mounted on said convergent nozzle means for movement between a raised position wherein gas flow in said upstream path is allowed to exit said case structure through said convergent nozzle means and thereby reverse the direction of engine thrust and a lowered position wherein downstream gas flow through said convergent nozzle means is unobstructed by said deflector means; and

(f) means linking said gas flow blocker means and said gas flow deflector means together such that they will move concurrently between their respective deployed and stowed positions and raised and lowered positions.

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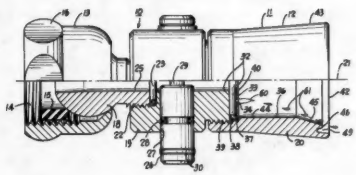
**4,591,098**

## APPARATUS FOR PRODUCING AERATED WATER

**Ralph G. Ridenour, 626 Lexington-Ontario Rd., Mansfield, Ohio 44903**

**Filed Aug. 1, 1983, Ser. No. 518,821**
**Int. Cl.[4] B05B *1/28, 1/26***
**U.S. Cl. 239—288.3** **10 Claims**



1. An apparatus for producing aerated water comprising, in combination:

a body having a longitudinal axis and having water inlet and downstream ends;

a coaxial aperture extending to the downstream end of said body;

said body having an annular outer wall surrounding said coaxial aperture;

an end wall of said body contiguous with said outer wall;

a terminating wall at the downstream end of said coaxial aperture recessed upstream from said end wall and facing said downstream end of said coaxial aperture;

said coaxial aperture having a cylindrical boundary wall and merging with a conical extension downstream thereof, said conical extension terminating at said terminating wall and having an included angle of approximately 30°;

an annular moat surrounding said terminating wall and extending between said terminating wall and said end wall;

said terminating wall being a substantially flat surface;

the intersection between said terminating wall and said conical extension being a sharp angle with a radius or chamfer not exceeding 0.003 inch and being physically protected from damage by being recessed upstream from said end wall at about a 120° included conical angle; and

restrictor means upstream of said coaxial aperture and having a cross-sectional area for water less than the cross-sectional area of said coaxial aperture to establish a partial

vacuum near the downstream end of said coaxial aperture to draw air into said coaxial aperture in a reverse direction from the downstream end of said coaxial aperture to help break up the water emanating from said restrictor means into aerated water.

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**4,591,099**

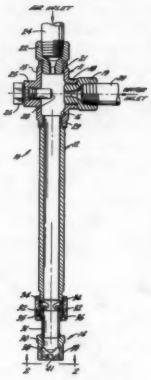
## NOZZLE TO PROVIDE FAN-SHAPED SPRAY PATTERN

**Lyle J. Emory, Darien, and Courtney J. Jones, Warrenville, both of Ill., assignors to Spraying Systems Co., Wheaton, Ill.**

**Filed Nov. 7, 1983, Ser. No. 549,240**

**Int. Cl.[4] B05B 7/04**

**U.S. Cl. 239—419** **20 Claims**



**1.** A spray nozzle assembly for directing fluid in a long and relatively narrow fan shaped pattern comprising, in combination:

(a) a mixing and discharge nozzle tip;

(b) said nozzle tip having means for permitting the coupling thereof to a fluid supply line;

(c) means defining a central longitudinally extending bore into said mixing and discharge nozzle tip;

(d) means defining a transverse mixing chamber in said mixing and discharge nozzle tip intersected by said central longitudinal bore;

(e) a pair of segmental diametrically opposed shoulders formed in said central longitudinal bore in parallel relation to the axis of said transverse mixing chamber and disposed at the plane of intersection of said central bore with said mixing chamber for imparting turbulence to the flow entering said mixing chamber; and

(f) means defining a discharge orifice communicating with said mixing chamber in a plane transverse to the axis of said mixing chamber and transverse to said segmental shoulders.

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**4,591,100**

## INJECTION NOZZLE

**David J. Gaskell, Upper Stanstead, and John W. Stevens, Sudbury, both of United Kingdom, assignors to Lucas Industries, Birmingham, England**

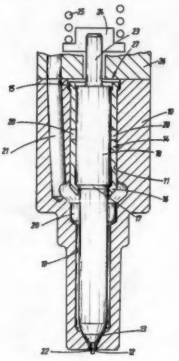
**Filed Aug. 9, 1984, Ser. No. 639,147**

**Claims priority, application United Kingdom, Aug. 25, 1983, 8322887**

**Int. Cl.[4] F02M 47/00**

**U.S. Cl. 239—533.3** **4 Claims**

**1.** A fuel injection nozzle for supplying fuel to an internal combustion engine comprising a body part, a stepped bore defined in the body part, said bore communicating at one end with an outlet opening extending to the exterior of the body part, a seating defined at said one end of the bore, a valve member movable in the bore, the valve member being shaped for co-operation with said seating, resilient means acting to urge the valve member into contact with said seating, a fuel inlet passage through which in use fuel under pressure can be supplied to act on a surface of the valve member to move the valve member away from the seating thereby to allow fuel flow through said outlet opening, an annular member surrounding the valve member, means on the annular member engageable with said valve member, said annular member being subjected to fuel under pressure so as to generate a force



which is applied to said valve member to assist the movement thereof away from the seating and means for limiting the movement of the annular member, said annular member comprising a sleeve defining a further bore and being slidable in said bore in the body part, the valve member being slidably mounted in said further bore, the sleeve being provided with passage means whereby the fuel pressures in use in the working clearances between the inner wall of the sleeve and the valve member and the outer wall of the sleeve and the wall of said bore in the body part, are substantially equal.

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**4,591,101**

## THROTTLING-PINTLE NOZZLE FOR FUEL INJECTION IN AN INTERNAL-COMBUSTION ENGINE

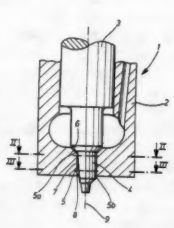
**Manfred Fortnagel, Korb, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Fed. Rep. of Germany**

**Filed Jul. 16, 1984, Ser. No. 631,077**

**Claims priority, application Fed. Rep. of Germany, Jul. 22, 1983, 3326468**

**Int. Cl.[4] F02M 61/06**

**U.S. Cl. 239—533.12** **3 Claims**



**1.** A throttling pintle nozzle arrangement for fuel injection in an internal-combustion engine comprising:

nozzle body means defining a spray hole, said spray hole exhibiting a mouth, and said nozzle body means defining a nozzle needle seat portion,

nozzle needle means including a throttling pintle disposed

for movement within the nozzle body means to control the flow of fuel through the spray hole via a passage between the pintle and the nozzle body means, said throttling pintle having a flattened portion,

said nozzle needle means being operable to be lifted off said nozzle needle seat portion under pressure of injected fuel in a direction counter to the direction of flow of the fuel, and the fuel flowing through the passage, said passage being defined by the nozzle body means and the flattened portion of the pintle, said flattened portion extending over the entire length of the pintle and being arranged at an angle relative to a center axis of the pintle, such that the largest cross-section of the passage is at the mouth of the spray hole.

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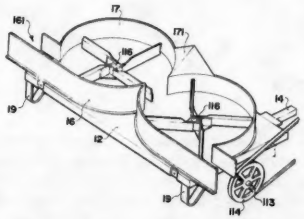
**4,591,102**

## CHAFF SPREADER FOR COMBINE HARVESTER

**James A. Clarke, Box 68, Rosetown, Saskatchewan, Canada S0L 2V0**

**Filed Aug. 20, 1984, Ser. No. 642,364**
**Int. Cl.[4] A01C** *15/04, 17/00*
**U.S. Cl. 239—655** **3 Claims**




**1.** A chaff spreading apparatus for a combine movable over ground having a crop thereon in the direction of travel and having a cleaning shoe from which chaff is discharged, the apparatus comprising a housing in the form of a flat substantially horizontal base member having a front edge, a rear edge and two sides and wall means upstanding from the base member, said housing being completely open above said base member for deposit of chaff thereon, means for attaching the housing to the combine below and rearwardly of the cleaning shoe to receive chaff therefrom, a pair of fans each including blade means, means mounting each of the fans on the base member for rotation relative to the base member in a plane parallel thereto about a respective axis at right angles thereto to eject chaff from the housing, said axes of said respective fans being spaced transversely to the direction of travel, each of said fans sweeping a circle wholly lying on the base member, said upstanding wall means defining a rear wall along the rear edge of the base member and a front wall along the front edge of the base member, said rear wall including a forwardly projecting V-shape defined by two part circular portions intesecting between said fans and arranged to closely follow the circles swept by said fans and two tangential portions projecting outwardly from said part circular portions at right angles to the directional of travel to respective sides of said base member, said front wall including a rearwardly projecting V-shape defined by two part circular portions intersecting between said fans and arranged to closely follow the circles swept by said fans and two outwardly projecting portions each substantially parallel to a respective one of said tangential portions of said rear wall and spaced therefrom to define a directional discharge nozzle confining the ejection of the chaff solely to respective sides of the base member, said rear wall having a greater height from said base member than said front wall.

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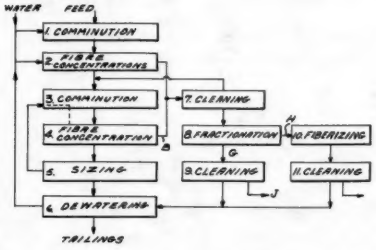
**4,591,103**

## ASBESTOS PROCESS

**John R. Andrews, Glen Waverley; Philip S. B. Stewart, Beaumaris, and George T. Hurst, Newport, all of Australia, assignors to ICI Australia Limited, Victoria and Woods Reef Mines Ltd., New South Wales, both of, Australia**

**PCT No. PCT/AU83/00061, § 371 Date Jan. 25, 1984, § 102(e) Date Jan. 25, 1984, PCT Pub. No. WO83/04190, PCT Pub. Date Dec. 8, 1983**
**PCT Filed May 13, 1983, Ser. No. 584,946**
**Claims priority, application Australia, May 25, 1982, PF4138**
**Int. Cl.[4] B02C** *19/12*
**U.S. Cl. 241—4** **16 Claims**




**1.** A wet process for the recovery of asbestos fibre from asbestos-bearing material which process comprises preparing a fibre concentrate by comminuting said asbestos-bearing material in the presence of water thereby forming a slurry, separating the fibre by means of at least one mechanical classifier and at least one spiral separator, and concentrating the fibre using at least one hydrocyclone of at least 150 mm diameter; fractionating said fibre concentrate into a well-opened fibre fraction and a poorly opened fibre fraction by means of at least one hydrocyclone of diameter less than 150 mm; and collecting the well-opened fibre fraction on a screen.

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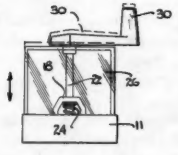
**4,591,104**

## CONDIMENT MILL

**William E. Bounds, 3737 W. 240th St., Torrance, Calif. 90505**

**Filed Aug. 30, 1984, Ser. No. 646,059**
**Int. Cl.[4] A47J** *42/08*
**U.S. Cl. 241—169.1** **9 Claims**




**1.** A mill for grinding condiment comprising;

a base member having a grinder receptacle formed therein,

a grinder head rotatably mounted in said grinder receptacle,

a casing member mounted on said base member,

a shaft attached to the grinder head, one end of the shaft extending through a wall of the casing member,

manipulator means attached to said one end of said shaft for rotating the shaft and grinder head relative to the grinder receptacle to grind the condiment, and

spring means mounted between the grinder head and the base member for resiliently urging the grinder head towards the receptacle and resiliently retaining the base member to the casing member,

there being mating detent and slot means formed on said casing and said base members for alternatively bringing the grinder head to a first position axially relative to the grinder receptacle for coarse grinding or a second position axially relative to the grinder receptacle for fine grinding, the casing and base members being rotatable one hundred eighty degrees relative to each other in going between said first and second positions, and being rotatable to a third position between the first and second positions for filling the casing member with condiment.

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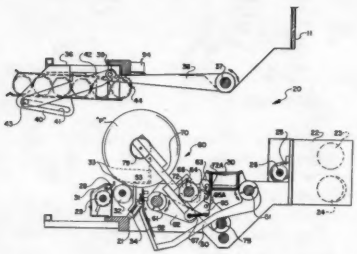
**4,591,105**

## METHOD AND APPARATUS FOR AUTOMATICALLY DOFFING AND DONNING TAKE-UP PACKAGES ON A WINDER

**Kurt W. Niederer, Charlotte, N.C., assignor to Belmont Textile Machinery Company, Belmont, N.C.**

**Filed Apr. 6, 1984, Ser. No. 597,636**
**Int. Cl.[4] B65H 67/04**
**U.S. Cl. 242—18 A** **13 Claims**



1. In a strand processing machine for winding a strand from a strand supply source onto a take-up package, a yoke having a chuck for holding the take-up package, a drive roll for driving the take-up package to thereby wind the strand thereon, a guide for guiding the strand onto the take-up package in a pre-determined pattern, means for stopping yarn feeding and rotation of the drive roll, a strand cutter for cutting the stationary strand from the take-up package to be doffed and a conveyor for receiving a full take-up package from the yoke and moving it to a discharge point, the improvement which comprises a positive control apparatus for doffing a full take-up package from and donning an empty take-up package onto the yoke, said doffing and donning apparatus comprising:

(a) means for pivoting the yoke away from the drive roll under positive control to the conveyor;

(b) means for depositing the full take-up package on the conveyor;

(c) means for returning the empty chuck of the yoke to a donning position in closely spaced-apart relation from the driving position of the empty take-up package against the drive roll;

(d) means for moving an empty take-up package to the chuck of the yoke at its position in said closely spaced-apart relation from the driving position against the driving roll whereupon the empty take-up package is donned into the chuck of the yoke; and

(e) means for attaching the free end of the strand to be wound onto the take-up package in said closely spaced-apart relation from the driving position of the take-up package against the drive roll;

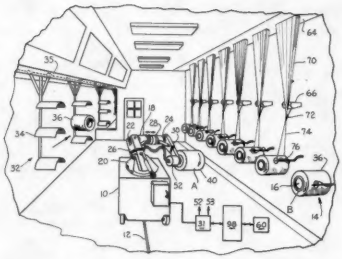
whereby the strand remains relatively taut as the take-up package moves into contact with the drive roll is not susceptible to tangling or being jerked by the take-up package as winding starts.

**4,591,106**

## AUTOMATIC DOFFING METHOD

**Benjamin A. Gay, P.O. Box 2683, Spartanburg, S.C. 29394**

**Filed May 16, 1985, Ser. No. 734,658**
**Int. Cl.[4] B65H 67/04**
**U.S. Cl. 242—18 G** **18 Claims**



1. In a method of producing fiberglass strands which includes continuously producing multiple glass filaments and gathering said multiple filaments together into a single fiberglass strand, and winding said fiberglass strand upon a draw winder of the type which includes a rotating collet to form a strand package wherein the improvement comprises a method of automatically doffing said strand packages which comprises:

providing a rotating doffing cup having a hollow cylindrical interior;

providing an inflatable cup liner in said hollow interior of said doffing cup;

positioning the doffing cup in an approach position in front of a full strand package which is to be doffed so that the axis of rotation of said doffing cup is parallel to and coincident with the axis of rotation of said full fiberglass strand package;

moving said doffing cup along its axis of rotation from said approach position to a doff position where said strand package is enclosed generally entirely within the hollow interior of said doffing cup;

dropping said strand extending from said strand package to said collecting ring off of an end of said strand package onto said collet to form auxiliary windings;

inflating said inflatable cup liner of said doffing cup until said strand package is gripped around generally the entire circumference thereof by said cup liner while rotating said doffing cup at a speed at least as great as the rotational speed of said collet of said draw winder;

retracting said doffing cup and gripped strand package along said axis of rotation while rotating in a manner such that a strand extends from said doffed strand package to said auxiliary windings on the surface of said collet;

severing said strand extending from said doffed strand package and said collet of said draw winder;

braking the rotation of said rotating doffing cup with said doffed strand package being held within the interior of said doffing cup; and

depositing said doffed strand package at a receiving station.

**4,591,107**

## YARN STORAGE AND FEEDING DEVICE

**Lars H. G. Tholander, Huskvarna, Sweden, assignor to Aktiebolaget IRO, Ulricehamn, Sweden**

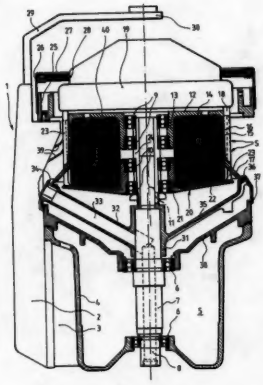
**PCT No. PCT/EP84/00211, § 371 Date Mar. 12, 1985, § 102(e) Date Mar. 12, 1985, PCT Pub. No. WO85/00351, PCT Pub. Date Jan. 31, 1985**

**PCT Filed Jul. 11, 1984, Ser. No. 711,920**

**Claims priority, application Fed. Rep. of Germany, Jul. 12, 1983, 3325159**

**Int. Cl.[4] B65H *51/24***

**U.S. Cl. 242—47.01** **11 Claims**



1. In a yarn storage and feeding device having a drum-shaped storage body the circumference of which constitutes a storage surface for a yarn storage, said storage body including two groups of cage rods, the cage rods of one group being movable in relation to the cage rods of the other group, said cage rods of both groups being arranged in an alternating manner and defining openings therebetween into at least one hollow interior space of the storage body, a resilient body being provided within said interior hollow space, comprising the improvement wherein said resilient body is a closed filler body filling the hollow interior space, said filler body simultaneously abutting the inner surfaces of the cage rods of both groups with radial preload and closing all said openings from the inner side thereof independently of the relative movement between the cage rods and the initial relative position of the cage rods to each other.

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**4,591,108**

## DRAGGING DEVICE FOR A SPINNING REEL

**Masuo Ban, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan**

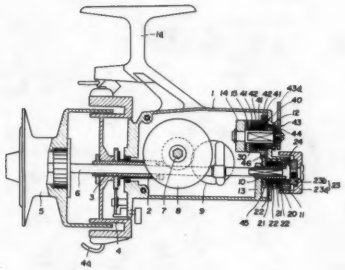
**Filed Sep. 26, 1984, Ser. No. 654,551**

**Claims priority, application Japan, Sep. 30, 1983, 58-183921; Dec. 5, 1983, 58-188236[U]; Dec. 29, 1983, 58-203722[U]**

**Int. Cl.[4] A01K *89/02***

**U.S. Cl. 242—84.5 R** **17 Claims**

1. A dragging device for a spinning reel, which applies a rotational resistance against rotation of a spool shaft carrying a spool, said dragging device comprising first and second drag mechanisms for applying said rotational resistance against rotation of said spool shaft, said first drag mechanism comprising a first dragging means non-rotatable relative to said reel body, a second dragging means rotatable in response to rotation of said spool shaft, and a first adjusting mechanism for causing said first and second dragging means to make press-contact with each other to adjustably apply a dragging force against rotation of said spool shaft, said second drag mechanism comprising a third dragging means non-rotatable relative to said reel body, a fourth dragging means rotatable in response to rotation of said spool shaft, and a second adjusting mechanism for causing said third and fourth dragging means to make press-contact with each other to adjustably apply a dragging force against rotation of said spool shaft, so that said first and



second drag mechanisms each can adjust by said first and second adjusting mechanisms respectively a dragging force applied against rotation of said spool shaft, whereby said spool shaft is adapted to be subjected to a total dragging force as adjusted by each of said drag mechanisms.

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**4,591,109**

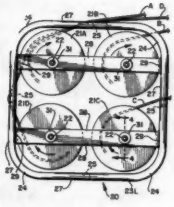
## WIRE DISPENSING MULTI-SPOOL PROTECTIVE HOLDER

**Stephen H. Kremer, R.R. #3, Monticello, Iowa 52310**

**Filed Apr. 1, 1985, Ser. No. 718,527**

**Int. Cl.[4] B65H *49/16***

**U.S. Cl. 242—129** **11 Claims**

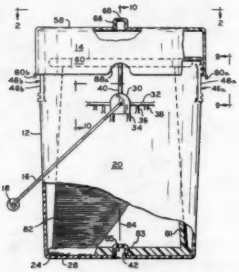


1. A wire dispensing multi-spool protective holder comprising: two duplicate aligned opposite side spaced parallel generally rectangular support tubular frame members with rounded corners; spacing bars welded at opposite ends to respective sides of the generally rectangular support tubular frame members; flat stock support means fastened to and spanning the space between two opposite sides of said generally rectangular support tubular frame members; a plurality of wire spool mounting rods mounted on and extending between the flat stock support means of one of said generally rectangular support tubular frame members and the flat stock support means of the other of said generally rectangular support tubular frame members; and with said plurality of wire spool mounting rods mounted in spaced parallel relation located such that all wire spools held in the structure that the multi-spool protective holder is designed to mount are held entirely within the transverse outer profile defined by the two duplicate aligned opposite side spaced parallel generally rectangular support tubular frame members that facilitate placement of the holder with any one of its side edges resting on a support surface.

## 4,591,110
## WIRE STORING AND DEREELING APPARATUS

Harold L. Wirts, Garrett, and Horace B. Corner, Fort Wayne, both of Ind., assignors to Mossberg Industries, Garrett, Ind.

Continuation of Ser. No. 634,958, Jul. 27, 1984. This application May 2, 1985, Ser. No. 729,532
Int. Cl.[4] B65H *49/08*
U.S. Cl. 242—129.8 21 Claims



20. Apparatus for storing and dereeling wire on a spool disposed with the axis thereof upright, comprising:

a container having an open top and adapted to receive said spool thereon,

a cover being receivable over said open top of said container, said cover being movable on said container between a closed position and a dereeling position wherein a midportion of said cover is spaced above said spool a predetermined distance,

locking means on one of said container and said cover to removably secure said cover in either said dereeling or closed positions,

said cover having a wire-receiving opening centrally thereof, said container having a closed bottom provided with an upstanding boss centrally thereof, a spool of wire fitted into said container, the spool having two flanges secured to the opposite ends of a barrel, one of said flanges having a centrally located arbor-receiving hole therein which slidably fits snugly over said boss thereby to inhibit said spool from tipping relative to said container.

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## 4,591,111
## THERMAL NAVIGATOR

Joseph S. Laughter, Millington, Tenn., assignor to University of Tennessee Research Corporation, Knoxville, Tenn.

Filed Dec. 2, 1983, Ser. No. 557,745
Int. Cl.[4] B64D *47/02*
U.S. Cl. 244—75 R 12 Claims

1. A thermal navigator for use in an ultralight aircraft, glider, or sailplane to detect and navigate within thermal updrafts so that lift provided by thermal updraft is maximized, said thermal navigator comprising:

right temperature sensor means mounted on the aircraft;

left temperature sensor means mounted on the aircraft and being laterally spaced-apart from said right temperature sensor means in a direction to the left of said right temperature sensor means;

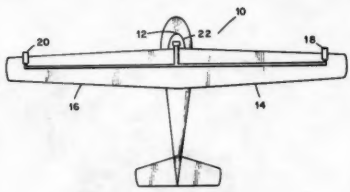
temperature difference measuring means for determining whether one of said right and left temperature sensor means is warmer and for measuring a temperature difference betwen said right temperature sensor means and said left temperature sensor means;

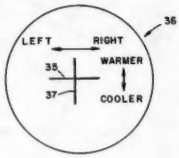
temperature difference indicator means for indicating whether one of said right and left temperature sensor means is warmer and for indicating said measured temperature difference;

a temperature derivative sensor means mounted on the aircraft;

temperature derivative measuring means for determining whether said temperature derivative sensor means is becoming warmer or cooler and for measuring a rate of change on said temperature derivative sensor means; and

temperature derivative indicator means for indicating the determination of whether said temperature derivative sensor means is becoming warmer or cooler and for indicating said measured rate of change, said indicator means having a pointer that points in one direction to indicate






that the aircraft is entering the thermal and points in an opposite direction to indicate that the aircraft is leaving the thermal, said indicator means being operable to move said pointer through a range of motion to indicate how fast the aircraft is entering the thermal and being operable to move said pointer through a range of motion to indicate how fast the aircraft is leaving the thermal, whereby the aircraft may be piloted to enter a thermal at a maximum speed by maximizing the motion of said pointer and may be piloted to leave the thermal at a maximum speed by maximizing the motion of said pointer.

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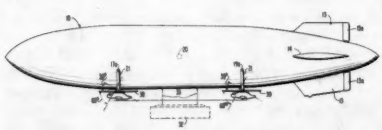
## 4,591,112
## VECTORED THRUST AIRSHIP

Frank N. Piasecki, Haverford, and Donald N. Meyers, Philadelphia, both of Pa., assignors to Piasecki Aircraft Corporation, Sharon Hill, Pa.

Continuation of Ser. No. 763,486, Jan. 28, 1977, abandoned, which is a continuation of Ser. No. 611,750, Sep. 9, 1975, abandoned. This application Oct. 12, 1979, Ser. No. 84,234
Int. Cl.[4] B64B *1/34*
U.S. Cl. 244—26 24 Claims



1. A vectored thrust airship comprising an aerostat hull containing a lighter-than-air gas, at least two pairs of thrust producing units each having a horizontally disposed main rotor with controllable pitch blades and means controlling the pitch of said main rotor blades collectively and cyclically to

include longitudinal and lateral cyclic pitch control, means attaching said thrust units to said aerostat hull such that each of a first of said pairs are attached to said hull on opposite sides of the airship longitudinal axis forwardly of the center of mass of said airship and each of a second of said pairs are attached to said hull on opposite sides of the airship longitudinal axis rearwardly of said center of mass, power means connected to the main rotors of each said thrust unit rotor for rotating the rotor blades, a master flight control including a translational control for control of the translational motion of the airship along and perpendicular to its longitudinal axis and an attitude control for control of the angular attitude of the airship about its center of mass, said translational control including a longitudinal translational control for control of the airship motion longitudinally of its axis and a vertical translational control for control of the airship vertical translational motion perpendicular to its axis, said attitude control including a pitch control for control of the airship attitude in pitch and a yaw control for control of the airship attitude in yaw, means interconnecting said main rotor pitch control means of each of said thrust units and said master flight control for the similar actuation of said main rotor pitch control means of said two pairs of thrust units upon operation of a translational control and for differential actuation of the rotor pitch control means of two thrust units located on one side of said airship center of mass and two thrust units located on the other side of said center of mass upon operation of an attitude control, operation of said longitudinal translational control establishing similar actuation of the main rotor longitudinal cyclic pitch control means of said main rotor, operation of said vertical translational control establishing similar actuation of the main rotor collective pitch control means of said main rotors, and operation of said pitch control establishing a differential actuation of the main rotor blade collective pitch control means of the main rotors of the thrust units forwardly of and rearwardly of the airship center of mass.

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## 4,591,113
## AIRCRAFT CONTROLS

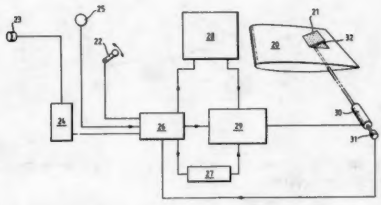
**Dennis G. Mabey, Bedford, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**

**Filed May 17, 1984, Ser. No. 611,159**

**Claims priority, application United Kingdom, May 26, 1983, 8314656**

**Int. Cl.⁴ B64C *9/34, 13/16***

**U.S. Cl. 244—76 C** **11 Claims**



1. Gust alleviating spoiler apparatus on an aircraft, said apparatus comprising hinged spoilers on the mainplanes of the aircraft, wherein said spoilers are hinged at their leading edges, a sensor of gusts in the aircraft's path, said sensor being at a forward location on the aircraft, and spoiler drive means responsive to output from said sensor for rotating said spoilers at a first angular rate to a first angular displacement, said first angular rate being sufficiently low to ensure that significant positive lift is not generated thereby, and for further rotating said spoilers at a higher angular rate than said first rate to reduce mainplane lift while the gust is significantly effective.

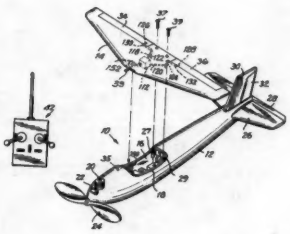
## 4,591,114
## AUTOMATIC INTERLOCK CONNECTOR ARRANGEMENT FOR RADIO-CONTROLLED MODEL AIRPLANES

**Alvin Block, Box 4208, Vero Beach, Fla. 32964**

**Filed Feb. 7, 1985, Ser. No. 699,261**

**Int. Cl.⁴ B64C *1/26***

**U.S. Cl. 244—120** **13 Claims**



1. In a radio-controlled model of the type having

(A) a first model part;

(B) a second model part routinely detachable by a radio control enthusiast after each model use from the first model part and routinely attached by the enthusiast before the next model use to the first model part in an intended position of use;

(C) a receiver supported by the first model part and operative, in response to a radio signal from a transmitter, for generating an electrical control signal; and

(D) a control component supported by the second model part and routinely disconnectable after each model use from the receiver and routinely electrically connected before the next model use to the receiver, said control component being operative, in response to the generation of the control signal, for controlling a model function each time when the control component is electrically connected to the receiver;

an automatic interlock connector arrangement for affirmatively making an electromechanical connection during the detachment between the receiver and the control component without having the enthusiast perform the electrical connection of the control component as a separate step, comprising:

(a) a first connector means electrically connected to the receiver and including a first stationary connector fixedly mounted to, and located at a first predetermined fixed location on, the first model part;

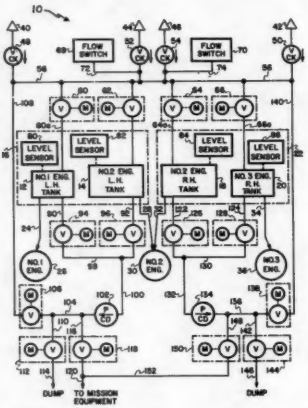
(b) second connector means electrically connected to the control component and including a second stationary connector fixedly mounted to, and located at a second predetermined fixed location on, the second model part; and

(c) said first stationary connector and said second stationary connector having respective mating portions which automatically electrically engage each other at said predetermined locations at the same time and each time that the second model part is attached to the first model part in the intended position of use, thereby ensuring that the electrical connection of the control component will be made and that the model function will be controlled.

## 4,591,115
## AUTOMATIC/MANUAL FUEL TANK SUPPLY BALANCE SYSTEM

**Joseph D. DeCarlo, Bridgeport, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Oct. 18, 1984, Ser. No. 662,337**
**Int. Cl.[4] B64C *17/10*; B64D *37/16***
**U.S. Cl. 244—135 C** **1 Claim**




1. In combination with a helicopter having first, second, and third main engines, a fuel supply balance system comprising:

first, second, third and fourth fuel tanks, said first and fourth fuel tanks each being smaller in volume than either of said second and third fuel tanks and being connected to deliver fuel directly to said first and said third engines, respectively, and said second and third tanks being connected to deliver fuel directly to said second engine;

a common fuel line for delivery of fuel to each of said tanks;

first, second, third and fourth electrically operated valves connected between said common fuel line and respective ones of said first, second, third, and fourth tanks;

first and second constant delivery pumps;

fifth and sixth electrically operated valves connecting said first and second tanks to said first constant delivery pump, and seventh and eighth electrically operated valves connecting said third and fourth tanks to said second constant delivery pump;

first, second, third and fourth level sensing means associated with said first, second, third, and fourth tanks, respectively, for providing electrical signals corresponding to the quantities of fuel in said tanks;

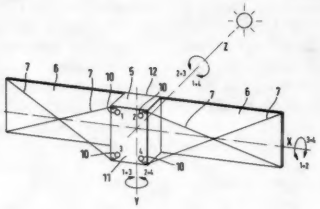
control means having manual and automatic modes of initiation and responsive in said automatic mode to said electrical signals corresponding to a fuel decrease to a predetermined minimum quantity of fuel in either of said first and fourth tanks to initiate operation of a corresponding one of said pumps and actuation of appropriate ones of said valves so as to automatically effect transfer of a predetermined incremental quantity of fuel from one of said second and third tanks to the tank having said fuel decrease to said predetermined minimum quantity; and

said control means further comprising interlock means for preventing operation of both of said pumps simultaneously, manually operated means, operable in said manual mode, for selectively ordering an incremental transfer of fuel from any one of said tanks to any other one of said tanks, and timing means, operative in said manual mode, for automatically terminating said incremental transfer upon transfer of fuel by running of one of said pumps for a predetermined time period corresponding to transfer of a predetermined weight of fuel.

## 4,591,116
## ATTITUDE CONTROL FOR SATELLITES

**Hans-Jürgen Guenther; Joachim Nauck, both of Bremen; Udo Renner, Leiden, and Wigbert Fehse, Lisse, all of Fed. Rep. of Germany, assignors to ERNO Raumfahrttechnik GmbH, Bremen, Fed. Rep. of Germany**

**Filed Jul. 25, 1984, Ser. No. 634,418**
**Claims priority, application Fed. Rep. of Germany, Aug. 19, 1983, 3329955**
**Int. Cl.[4] B64G *1/24***
**U.S. Cl. 244—168** **4 Claims**

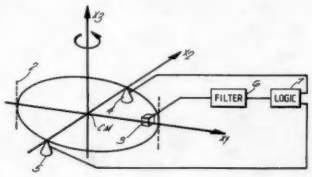


4. Attitude control for satellite comprising a turning cross mounted on the satellite, and a solar panel mounted on the turning cross having ends connected through cable to portions of the turning cross, there being winches on the turning cross for individually pulling said cable to change the curvature of the respective panel, the turning cross being rotatable in addition on an axis.

## 4,591,117
## SPACECRAFT NUTATION DAMPING

**Peter R. Scott, Stevenage, England, assignor to British Aerospace Public Limited Company, London, England**

**Filed Mar. 12, 1984, Ser. No. 588,822**
**Claims priority, application United Kingdom, Mar. 12, 1983, 8306859**
**Int. Cl.[4] B64G *1/38***
**U.S. Cl. 244—170** **5 Claims**




1. An active nutation damping system for a spin-stabilised spacecraft, the system comprising:

sensor means for supplying a time varying signal indicative of nutation of the spacecraft,

actuating means for applying a compensatory torque to the craft, and

signal processing means for controlling the actuating means to cause the application to the craft of time varying nutation reducing torque having Fourier frequency components corresponding to respective Fourier frequency components of the sensor signal,

the processing means being structured to differentiate between a first and a second class of said components such that the component of the angular velocity of the craft about any axis orthogonal to its spin axis as determined by

each sensor signal component of the first class is substantially opposite in phase to the corresponding torque component about the same orthogonal axis, and the component of the angular velocity of the craft about any axis orthogonal to its spin axis as determined by each sensor signal component of the second class is substantially in phase with the corresponding torque component about this orthogonal axis.

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**4,591,118**

## HYSTERESIS CONDITIONER FOR SPACECRAFT ATTITUDE CONTROL

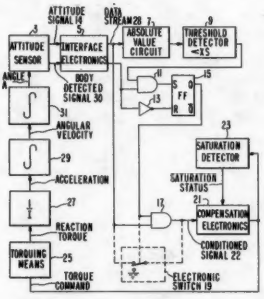
**Fred N. Chan, Atherton, Calif., assignor to Ford Aerospace & Communications Corporation, Detroit, Mich.**

**PCT No. PCT/US84/00238, § 371 Date Feb. 17, 1984, § 102(e) Date Feb. 17, 1984, PCT Pub. No. WO85/03686, PCT Pub. Date Aug. 29, 1985**

**PCT Filed Feb. 17, 1984, Ser. No. 619,169**

**Int. Cl.⁴ B64G *1/36***

**U.S. Cl. 244—171** **10 Claims**




1. Apparatus for stabilizing the attitude of a spacecraft with respect to an astronomical body, comprising:

mounted on the spacecraft, means for sensing the attitude error angle, orthogonal to a sensing axis, between a line fixedly associated with the spacecraft and a line connecting the spacecraft with the astronomical body, said sensing means being capable of detecting the presence of the astronomical body within a detection angular domain that is less than 360° and producing an attitude signal representative of said angle;

coupled to the sensing means, means for conditioning the attitude signal to enhance spacecraft stability, said conditioning means comprising a hysteresis loop and producing a conditioned signal; and

mounted on the spacecraft and coupled to the conditioning means, means for forcing said error angle towards zero, said forcing means having as an input of said conditioned signal; wherein

for error angles outside of the detection angular domain, the amplitude of the conditioned signal is suppressed, to inhibit the actuation of the forcing means.

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**4,591,119**

## PIPE SUPPORT

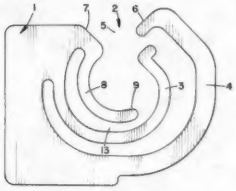
**Willibald Kraus, Kaiserslautern, Fed. Rep. of Germany, assignor to TRW United-Carr GmbH, Frankfurt**

**Filed Mar. 23, 1984, Ser. No. 592,973**

**Int. Cl.⁴ F16L *3/08***

**U.S. Cl. 248—74.2** **9 Claims**

1. In a support element for a pipeline having a mounting portion and a support portion which partially encircles the pipeline circumference, the support portion comprising two arcuate dish-shaped elements in the form of an inner dish and outer dish, said outer dish being radially spaced from and surrounding the inner dish, said inner dish having a reference center defining its radius within said support, both dishes having a common open area defined by a lip on the outer dish and the exterior surface of the mounting portion, whereby the lip of the outer dish and the exterior surface of the storage area



form a slot which leads to the inner dish, the improvement wherein the support portion includes a third resilient arcuate dish member having a reference center defining its radius, said reference centers being offset from one another so that said third dish member is positioned a predetermined distance from and is encircled by said inner dish element.

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**4,591,120**

## TILTABLE AND/OR ROTATABLE SUPPORT FOR DISPLAY DEVICE

**Keith C. Bryant-Jeffries, Eastleigh; Ian Golledge, Romsey; John V. Pike, Winchester, and Eric V. Vaughan, Eastleigh, all of England, assignors to International Business Machines Corporation, Armonk, N.Y.**

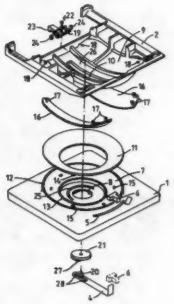
**Filed Jul. 8, 1982, Ser. No. 396,537**

**Claims priority, application European Pat. Off., Jul. 20, 1981, 81303305.7**

**The portion of the term of this patent subsequent to May 27, 2003, has been disclaimed.**

**Int. Cl.⁴ F16M *11/12***

**U.S. Cl. 248—179** **9 Claims**

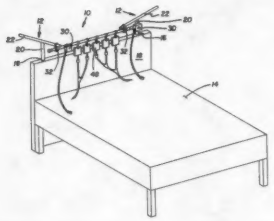


1. A tiltable and rotatable support for a unit, for example a display device, comprising a base member and a top member having spherically contoured mating surfaces slidable one over the other forming a shallow ball and socket connection in order to tilt and rotate one member relative to the other member, and a locking mechanism interconnecting the members and operable to frictionally engage one member but to rotate relatively freely on the other member, the rotational axis of said locking mechanism being fixed with respect to said other member, said mechanism being arranged in operation to lock said members in position against relative-tilting while permitting relative rotation therebetween.

## 4,591,121
## HOSPITAL I.V. POLE ADJUNCT

Raymond E. Doyle, 13218 Ravine Trail, Fort Wayne, Ind. 46804

Filed Jul. 6, 1984, Ser. No. 628,521
Int. Cl.[4] A47B 97/00
U.S. Cl. 248—201 15 Claims



9. A hospital I.V. pole adjuct for supporting I.V. fluid containers and medical devices connected to a patient, in association with or apart from a patient support structure which includes a pair of spatially related I.V. poles which have arms, said hospital I.V. pole adjunct comprising: a rigid, elongate main member having a central portion and ends, a pair of connectors displaceably mounted on said main member, said connectors each having a recurvate hook portion and a band portion, said hook portions engaging said arms of said I.V. poles on a one-to-one basis, said hook portions each having a bend and a shank, said bend being predominately engaged by a respective one of said arms during rotational movement of said respective arm in a direction toward said central portion of said main member, said shank being predominately engaged by said respective arm during rotational movement of said respective arm in a direction away from said central portion of said main member, said band portions loosely encircling said main member, said band portions being deflectable into gripping relationship with said main member, said band portions restricting movement of said connectors in a direction toward said central portion of said main member by said rotational movement of said respective arm in a direction toward said central portion of said main member and said predominant engagement of said bend of said hook by said arm, a plurality of retainers displaceably mounted on said main member, said retainers supporting said I.V. fluid containers and said medical devices, a pair of stops detachably connected to said ends of said main member to limit the displacement of said connectors and said retainers.

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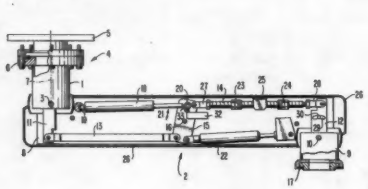
## 4,591,122
## SUPPORT STRUCTURE WITH A SUPPORT ARM PIVOTAL FOR HEIGHT ADJUSTMENT

Friedhelm Kreuzer, Zwiedineckstrasse 16, 8000 Munich 50, Fed. Rep. of Germany

Filed Jun. 5, 1984, Ser. No. 617,466
Claims priority, application Fed. Rep. of Germany, Jun. 6, 1983, 3320437; May 7, 1984, 3416823
Int. Cl.[4] E04G 3/00
U.S. Cl. 248—280.1 25 Claims



1. A support structure comprising a support arm means pivotal for purposes of height adjustment, means including spring means for balancing the weight of the support arm means, mounting means at the free end of the support arm means for retaining thereat apparatus, the support arm means including a support frame means and at least two connecting rods which, are pivotally connected at one end thereof with a guide means and at the other end thereof with separate connecting members forming two parallelogram guidances, said guide means and said connecting members being rotatably supported on said support frame means, and at least one compression spring means installed between the support frame means and the guide means.

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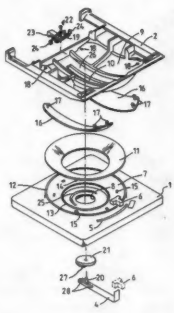
## 4,591,123
## ADJUSTABLE BRAKE ASSEMBLY

Thomas H. Bradshaw, Eastleigh; Ian Golledge, Romsey, and John V. Pike, Winchester, all of England, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 8, 1982, Ser. No. 396,538
Claims priority, application European Pat. Off., Jul. 20, 1981, 81303306.5
Int. Cl.[4] A47B 91/00
U.S. Cl. 248—349 6 Claims

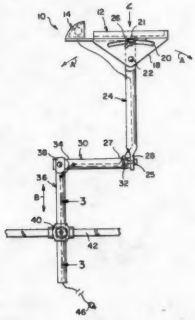


1. A tiltable and rotatable support for a unit, for example, a display device comprising a base member and a top member having spherically contoured mating surfaces, a shaft mounted for axial movement extending through apertures in the two surfaces, the aperture in one of said surfaces being in the form of an elongated slot, the arrangement being such that the slotted and companion members are rotatable relative to one another about said shaft and tiltable relative to one another by an amount determined by the longitudinal movement of the slotted member about said shaft, and a locking mechanism operable to cause a brake member supported at one end of the shaft to be brought into frictional engagement with the elongated slotted member to clamp said base and top members together, characterized by the combination of a locking mechanism including a camming mechanism connected between the other end of said shaft and the companion member, so as to be operable to positively draw said brake member into frictional engagement with said slotted member to prevent subsequent tilt adjustment of the members, or to release said brake member from said frictional engagement to enable subsequent tilt and rotate adjustment of the members, and a detent means extending from said brake member co-acting with the other member to limit relative rotation of said members.

## 4,591,124
## HOSPITAL BED READING BOOK SUPPORT

**Odon Hellenbrand, and George Spector, both of 233 Broadway, Rm. 3615, New York, N.Y. 10007**

**Filed Jan. 24, 1985, Ser. No. 694,530**
**Int. Cl.[4] A47B *23/00***
**U.S. Cl. 248—447.2** **2 Claims**



1. A hospital bed reading book support with a lamp attached, comprising:

(a) an uppermost book rest;

(b) a lamp affixed to said book rest;

(c) an upper post pivotable in a vertical plane having an upper end and a lower end, said upper end being pivotally connected to a lower portion of said book rest whereby said book rest can pivot in a plane perpendicular to the first said plane to assume a number of different positions towards and away from the reader;

(d) means for locking said book rest in each of said number of different positions comprising a pivotable plate affixed to said lower portion having a slot slidable about a wing nut and bolt;

(e) a horizontal post having a first end, a second end and a longitudinal axis, said first end of said horizontal post being pivotably connected to said lower end of said upper post so that said upper post may pivot in a plane that is perpendicular to said longitudinal axis of said horizontal post and assume a number of different positions laterally towards and away from the reader;

(f) means for locking said upper vertical post in each of said number of different positions;

(g) a lower vertical post having an upper end pivotally connected to said second end of said horizontal post so that said horizontal post may pivot in a vertical plane thereby lowering or raising the book rest;

(h) means for locking said horizontal post in each of said number of different positions;

(i) a tee bracket fixedly attached to a rail of the hospital bed and containing a throughbore for slidingly receiving a lower end of said lower vertical post so that said lower vertical post may slide up and down with respect to said tee clamp and assume a number of different positions; and

(j) means for locking said lower vertical post in each of said number of different positions.

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## 4,591,125
## PICTURE HANGING DEVICE

**Lucien J. Bellehumeur, 71 rue Principale, Apt. 8, Rouyn, Quebec J9X 4P3, Canada**

**Filed May 2, 1985, Ser. No. 729,748**
**Int. Cl.[4] A47G *1/24***
**U.S. Cl. 248—476** **31 Claims**

1. A picture hanging device comprising a male member adapted to be rigidly secured to the rear surface of a picture frame or other like object and a female member adapted to be rigidly secured to a wall or other like support surface, said male member including a fastening flange and a resilient vertically depending tongue normally lying in the same vertical plane, said male member being provided with a spacing portion, said spacing portion protruding outwardly beyond said tongue and said fastening flange, said female member including

a guiding portion and a slot, said guiding portion being adapted to contact said spacing portion when said tongue is fully inserted within said slot, a portion of said tongue being exposed above said slot when said tongue is fully inserted therein, said exposed portion being outwardly deflected whereby the lower edge of said frame or other like object is biased toward said wall or other like support surface.

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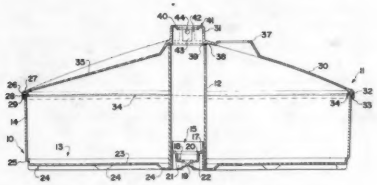
## 4,591,126
## BASE FOR SUPPORTING AN UPRIGHT POST OF A GARDEN UMBRELLA OR THE LIKE

**Sheldon Berney, Winnipeg, Canada, assignor to Reliance Products Ltd., Winnipeg, Canada**

**Filed Nov. 23, 1984, Ser. No. 674,237**
**Int. Cl.[4] F16M *13/00***
**U.S. Cl. 248—524** **6 Claims**



1. A base for supporting an upright post comprising a receptacle portion having a base for standing on a horizontal support surface, a lid portion for covering said receptacle portion so as to define therewith a hollow container having a surrounding wall for receiving and containing a pourable ballast material, said receptacle and lid portions being formed from plastics material and having cooperating peripheral continuous snap sealing means by which they can be interconnected, the snap sealing means of each of said lid and receptacle portions constituting the portions thereof of greatest distance from a central axis thereof whereby the lid portion and receptacle portion can be formed by injection molding technique, said receptacle portion having integrally formed therein a plinthe defined in the base thereof for supporting a lower end of the post, said plinthe including a first sleeve portion having a central axis thereof vertically upstanding from the base, a first horizontal surface internally of and connected to said sleeve portion at a position above the base so as to extend therefrom to an innermost edge of the surface, a second sleeve portion co-axial to

the first sleeve portion and connected to said innermost edge of said first horizontal surface and extending therefrom downwardly to a lowermost edge, a second horizontal surface extending inwardly from said lowermost edge at a position above the base, and fin means extending radially of said central axis to said first sleeve portion and arranged to support said first and second horizontal surfaces, said lid portion having an aperture through which said post can pass for engaging one of said horizontal surfaces of said plinthe depending upon the diameter of the post and a tube portion closely surrounding said first sleeve portion so that one end thereof engages the base, said lid portion having a collar surrounding the aperture providing a lip so as to locate an opposed upper end of said tube portion.

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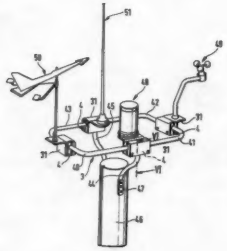
**4,591,127**

## SUSPENSION ATTACHMENT

**Pär-Ake Tuvesson, Lövängsvägen 4, 262 00 Ängelholm, Sweden**

**Filed Sep. 21, 1984, Ser. No. 653,088**
**Claims priority, application Sweden, Apr. 9, 1984, 8401956**
**Int. Cl.[4] E05B** *73/00*
**U.S. Cl. 248—551** **15 Claims**



7. A mast top arrangement comprising a closed frame and a plurality of holder means disposed on said frame, each of said holder means comprising:

(a) a first channel extending through said holder means for accommodating a portion of said frame, and a second channel extending through said holder means, said second channel being perpendicular to said first channel,

(b) an elongated anchoring means, wherein a first end of said anchoring means is received in said second channel;

(c) a mast attachment coupled to a first end of said anchoring means for attachment to a mast,

(d) clamping means extending through said second channel for clamping said holder means securely against said frame,

(e) a generally U-shaped accessory attachment adapted to removably fit over each of said holder means and to be anchored thereto; and

(f) means on said accessory attachment for receiving an accessory thereon.

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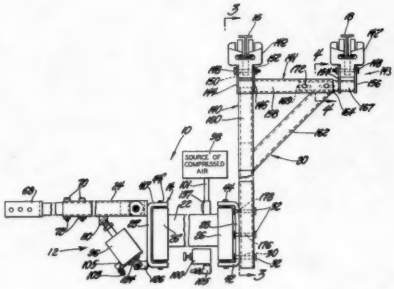
**4,591,128**

## TOOL REACTION BALANCING MECHANISM

**Gregory J. Karlichek, 269 Scott Lake Rd., Pontiac, Mich. 48055, and Ronald J. Secord, 45824 Wakefield, Utica, Mich. 48087**

**Filed Aug. 2, 1984, Ser. No. 637,157**
**Int. Cl.[4] F16M** *3/00*
**U.S. Cl. 248—652** **41 Claims**

1. A tool reaction balancing mechanism comprising an articulated arm including a first arm portion, means at one end of said first arm portion mounting one end of said first arm portion to a support assembly for pivotal movement about a first generally vertical axis, a second arm portion, means at the other end of said first arm portion mounting one end of said second arm portion to the other end of said first arm portion for pivotal movement about a second generally vertical axis, a third arm portion mounted at one end thereof to the other end of said second arm portion for pivotal movement about a third generally horizontal axis, tool holding means at the other end of said third arm portion, and power balancing means allowing free upward and downward pivotal movement of said third



arm portion about said third axis by an operator to selectively move a tool held in said tool holding means and operative in response to such upward and downward pivotal movement of said third arm portion about said third axis to provide a power assist to such upward movement and a controlled balancing of such downward movement.

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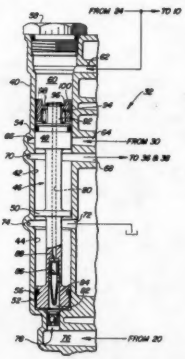
**4,591,129**

## VALVE SEAL BREAKAWAY DEVICE

**Jerald D. Bernard, Cedar Falls, and Sarkis A. Koltookian, Waterloo, both of Iowa, assignors to Deere & Company, Moline, Ill.**

**Filed May 2, 1985, Ser. No. 729,515**
**Int. Cl.[4] F16K** *29/00, 31/363;* **F01B** *11/02*
**U.S. Cl. 251—64** **3 Claims**



1. A spool valve having a housing, a valve bore extending therein to an end wall and a spool slidably and sealingly mounted in the bore, characterized by:

the spool having a stem projecting from the end thereof;

an engagement member movably mounted on the spool and projecting axially from an end of the spool to a first end which is engageable with the end wall, the engagement member being slidably carried on the stem, the engagement member comprising a hollow cylinder with a radially inwardly extending flange slidably receiving the stem, the engagement member having an axial length which

exceeds an axial length of the stem, the spool and the stem cooperating to define an annular end face which faces the end wall, the engagement member having a second end which is engageable with the end face;

a resilient member coupled between the spool and the engagement member and biased to urge the engagement member away from the spool; and

stop means for retaining the engagement member on the spool, for limiting movement of the engagement member and for maintaining at least a predetermined minimum bias in the resilient member, the spool being movable to a position near the end wall wherein engagement of the end wall with the first end causes disengagement of the engagement member from the stop means, thereby compressing the resilient member so that the resilient member, acting through the engagement member, is biased to urge the spool away from the end wall and away from said position.

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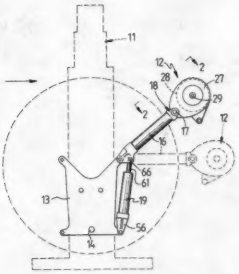
**4,591,130**

## GROUND ROLLER

**Karl E. Smith, Bessemer, and Wei-Chung Lin, Pelham, both of Ala., assignors to Bethea Electrical Products, Inc., Pelham, Ala.**

**Filed Mar. 11, 1985, Ser. No. 710,612**
**Int. Cl.[4] B65M *59/22***
**U.S. Cl. 254—134.3 PA** **6 Claims**




1. In a bundle conductor stringing block having a main frame including vertically extending side members supporting a horizontal shaft having mounted thereon a plurality of conductor stringing sheaves in axial alignment with a centrally disposed hauling line sheave, a grounding apparatus comprising:

(a) a pair of pivotally mounted support arms resiliently mounted to said main frame outwardly of said sheaves;

(b) a mounting rod mounted non-rotatably between said support arms proximal the periphery of said sheaves; and

(c) a plurality of ground rollers, each independently pivotally mounted on said mounting rod and including a support frame pivotally mounted on said mounting rod, a roller shaft supported in said frame parallel to said mounting rod, and an electrically conductive sheave rotatably mounted on said roller shaft and corresponding to each of said conductor stringing sheaves, with each of said ground rollers being resiliently upwardly biased to engage an associated conductor through the use of a bushing mounted non-rotatably on said mounting rod internally of said support frame, said bushing having a pair of radially extending tabs thereon adjacent said support frame and said bushing also having formed thereon a radially extending spring arm, said support frame having formed thereon inwardly facing angularly spaced apart stops adjacent said mounting bar and bracketing said tabs for limiting the pivotal motion of said support frame, a spring mounting projection formed on said support frame and extending perpendicular to said shaft and rod, and a tension spring attached at one end to said projection and at the other end to said spring arm and urging said frame upwards.

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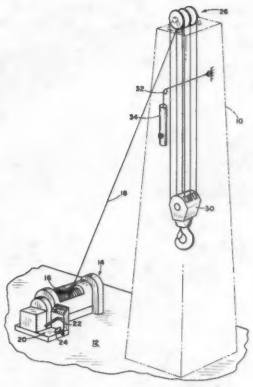
**4,591,131**

## DRAW WORKS TRAVELING BLOCK MOTION CONTROL APPARATUS

**Gerald A. Rhoads, 1335 Eighth Ave., Yuma, Ariz. 85364**

**Filed Oct. 11, 1984, Ser. No. 660,433**
**Int. Cl.[4] B66D *1/56*; G05G *1/04***
**U.S. Cl. 254—269** **8 Claims**




1. Apparatus for limiting the vertical movement of a traveling block in a derrick, the movement of said travelling block being controlled by a power driven wire line draw works located on or adjacent a floor of said derrick, the draw works including an accelerator and a brake controlled by an operator comprising:

(a) a first guide attached to said derrick;

(b) a guide tube vertically oriented and attached to said derrick below said first guide;

a counterweight reciprocably located within said guide tube;

(d) sensing means positioned on said guide tube to sense the location of said counterweight in said guide tube and to generate a signal upon sensing a predetermined location of said counterweight;

(a) a wire line extending across the path of said vertical movement of said traveling block from a first end of said wire line affixed to said derrick opposite said first guide, thence around said first guide and coupled to a top of said counterweight for raising said counterweight toward said predetermined location when said travelling block engages said wire line; and

(f) control means responsive to said signal generated by said sensing means to halt movement of said draw works upon said counterweight reaching said predetermined location.

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**4,591,132**

## APPARATUS FOR CONTROLLING THE GAS CARBURIZATION OF STEEL

**Joachim Wünning, Berghalde 20, 7250 Leonberg 7, Fed. Rep. of Germany**

**Filed Mar. 22, 1985, Ser. No. 714,802**
**Claims priority, application Fed. Rep. of Germany, Mar. 29, 1984, 3411605**
**Int. Cl.[4] C21D *11/00***
**U.S. Cl. 266—80** **2 Claims**

1. Apparatus for the gas carburization of a steel part in which the surface of the steel part is exposed to a carbon-enriched atmosphere, said apparatus comprising:

a carburizing furnace having a heated chamber in which the steel part is to be positioned,

temperature sensing means for sensing the temperature of the atmosphere in said furnace chamber,

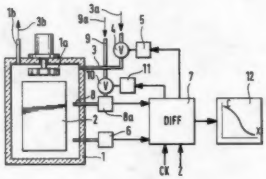
a first feeder line for introducing a carburizing agent into said furnace chamber,

a first control valve in said first feeder line for controlling the rate of flow of said carburizing agent,

carbon sensing means extending into said chamber and including an electric measuring resistor formed of iron and exposed to the furnace chamber to measure a carbon content of said atmosphere, said resistor disposed in a sensor chamber exposed to said furnace chamber,

a second feeder line for introducing a decarburizing gas directly into said sensor chamber,

a second control valve in said second feeder line for regulating the flow of decarburizing gas to said sensor chamber,




analyzer means for receiving a temperature value from said temperature sensor and a carbon value from said carbon sensor for a time interval to calculate a flow of carbon diffusion into the surface of the steel part during such interval and for generating a control signal as a function thereof for actuating said first control valve to vary the flow of carburizing agent into said furnace chamber, and for periodically readjusting the carbon content of said measuring resistor to correspond to the carbon content of the surface of the steel part by intermittently actuating said second control valve to supply decarburizing gas to said sensor chamber, so that said measuring resistor attains substantially the same carbon content as said surface of the steel part to reduce the risk of overcarburizing that surface.

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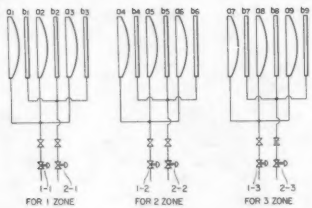
**4,591,133**

## COOLING APPARATUS FOR THICK STEEL PLATE

**Masaki Umeno; Keiji Fukuda, and Yasumitsu Onoe, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Continuation of Ser. No. 443,654, Nov. 22, 1982, abandoned.**
**This application Nov. 15, 1984, Ser. No. 671,798**
**Claims priority, application Japan, Nov. 20, 1981, 56-186452**
**Int. Cl.[4] C21D *1/62***
**U.S. Cl. 266—114** **6 Claims**




1. A cooling apparatus for applying cooling water in the form of a water volume profile to the surfaces of a variety of steel plates having an elongated strip form and traveling in the direction of their lengths for uniformly cooling the plates, the plates having a width ranging from narrow to wide and a thickness ranging from thin to thick, the variety of plates requiring a range of shapes of water volume profiles from a profile with a maximum crown to a profile with less of a crown than said maximum crown, said apparatus comprising:

a base extending in the direction of travel of said steel plate and having a plate conveying path with a width for accommodating the widest plate to be cooled;

a plurality of rod-like headers on said base and extending in the width direction of the steel plates across substantially the entire width of the conveying path;

a cooling water source;

said plurality of headers being in a plurality of header groups each consisting of a plurality of headers, the headers in each group each being provided with an adjustable valve for controlling the volume of water flow to the individual headers, said headers in one group being interspersed among the headers of the other group or groups, the headers in each group being connected in parallel to said cooling water source;

a flow control valve connected between each header group and said cooling water source;

each of said headers having unvalved nozzle means thereon and positioned along the length of the header and directed toward the steel plate conveying path, the nozzle means on the headers of each group having nozzle openings for supplying to said steel plate cooling water in a water volume profile distributed in the direction of the width of the steel plates, the nozzle means on the headers of one group forming a water volume profile having a crown corresponding to the maximum crown needed for cooling steel plates at one end of the range of shapes of steel plates uniformly across the width thereof, and the nozzle means on the headers of at least one of the other groups forming a water volume profile having a shape between a water volume profile with a lesser crown than the crown of the headers of said one group and a water volume profile with no crown, for, when it is combined with the water volume profile of the headers of said one group, producing a water volume profile having less of a crown than the maximum crown produced by the headers of said one group of headers.

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**4,591,134**

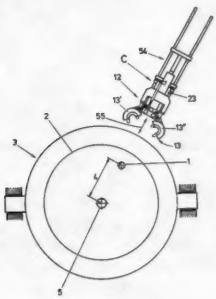
## ARRANGEMENT FOR CLEANING A LANCE HEAD OF A LANCE INTRODUCIBLE INTO A METALLURGICAL VESSEL

**Hellmuth Smejkal; Walter Rockenschaub, both of Linz, and Johann Fohler, Ottensheim, all of Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria**

**Filed Apr. 17, 1985, Ser. No. 724,005**
**Claims priority, application Austria, May 8, 1984, 1507/84**
**Int. Cl.[4] C21C *5/46***
**U.S. Cl. 266—135** **12 Claims**

1. In an arrangement for cleaning a lance head of a lance introducible into a metallurgical vessel, such as a lance carrying a measuring and/or sampling probe, of the type including a cleaning head being in contact with said lance head and peripherally surrounding said lance head during said cleaning, said lance having a lance axis in the direction of which said cleaning head and said lance are relatively movable, the im-

provement which comprises an adjustment means adapted to place said cleaning head and said lance into aligning positions,



and an oscillation means adapted to set said cleaning head into a rotational movement reciprocating about said lance axis.

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**4,591,135**

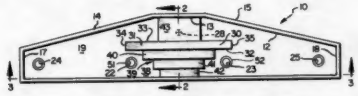
## FLUID FLOW CONTROL STRUCTURE FOR TUNDISH

**Donald R. Fosnacht, Crown Point, and Masood A. Tindyala, Highland, both of Ind., assignors to Inland Steel Company, Chicago, Ill.**

**Continuation-in-part of Ser. No. 640,878, Aug. 15, 1984, abandoned. This application Sep. 27, 1984, Ser. No. 654,738**

**Int. Cl.[4] C21C *1/06***

**U.S. Cl. 266—275** **9 Claims**



1. An elongated tundish for the continuous strand casting of molten metal, said tundish

a pair of side walls disposed substantially in the longitudinal direction of said tundish and a pair of opposite end walls each extending in a lateral direction between said sidewalls;

a tundish bottom and a substantially open tundish top;

said tundish bottom comprising a plurality of inner molten metal outlet openings and an outer pair of outlet openings all of which are aligned in a row extending longitudinally between said end walls;

said tundish bottom having a ladle nozzle stream impact location laterally spaced from said row of outlet openings and disposed between said end walls at a location not adjacent but distant from each end wall;

an elongated dam extending upwardly from said tundish bottom between said ladle nozzle stream impact location and said row of outlet openings;

said dam extending longitudinally between said end walls and having a pair of opposite ends each spaced from a respective end wall;

and flow control structure located between said elongated dam and one of said side walls and comprising means for reducing the dead zone volume fraction of molten metal in said tundish, compared to a tundish containing said elongated dam but without said flow control structure.

**4,591,136**

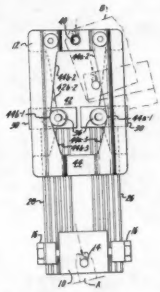
## SPRING MECHANISMS

**George H. Leonard, 327 Hollow Tree Ridge Rd., Darien, Conn. 06820**

**Filed Apr. 13, 1984, Ser. No. 599,783**

**Int. Cl.[4] F16F *1/14***

**U.S. Cl. 267—154** **27 Claims**



23. A spring mechanism, including a spring-and-cam combination having first and second output parts movable toward and away from each other, means holding one of said output parts at a fixed position, a device having substantial weight movable up and down through an operating stroke, and a mechanical coupling between said device and said spring-and-cam combination, said spring-and-cam combination having any number, including one, of torsion column units, each of said number of torsion column units including:

a torsion column having a twist axis and comprising at least one elongated resilient metal rod,

first means for securing a first portion of said torsion column to said first output part and for fixing said first portion of each of said number of torsion columns against turning about its axis relative to said first output part,

at least one cam couple comprising first and second cam parts, said cam parts including a cam track extending along and only partway around a respective torsion column and a cam follower cooperating with said cam track,

second means for securing said first cam part to said second output part and for preventing said first cam part from moving about said twist axis, and

third means for securing said second cam part against turning relative to a second portion of said torsion column spaced along its twist axis from said first portion of such torsion column,

the cam tracks in all of said number of torsion column units having such contour as, acting through said mechanical coupling, to counterbalance at least approximately the weight of said device along a substantial portion of said operating stroke.

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**4,591,137**

## PROTECTIVE COVERING FOR THE PISTON OF A TELESCOPING SPRING ELEMENT

**Klaus Steinberg, Mauern, Fed. Rep. of Germany, assignor to Bayerische Motoren Werke, AG, Fed. Rep. of Germany**

**Filed Oct. 26, 1984, Ser. No. 665,540**

**Claims priority, application Fed. Rep. of Germany, Oct. 26, 1983, 3338801**

**Int. Cl.[4] F16F *1/00*; F16L *11/00***

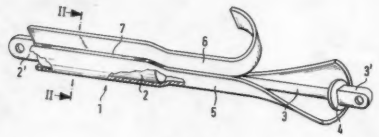
**U.S. Cl. 267—182** **15 Claims**

1. A protective covering apparatus comprising the combination of

a telescoping spring element and

a protective covering for a piston rod of said telescoping spring element, the spring element having a cylinder casing, the protective covering consisting of polymeric mate-

rial and surrounding, in a paint-tight manner, on the one hand, the cylinder casing of the spring element at least at its end section near the piston rod and, on the other, the



free end section of the piston rod, the protective covering including further means forming at least one intentional separating place extending in the longitudinal direction.

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**4,591,138**

## JOINTED PNEUMATIC GRIPPING APPARATUS

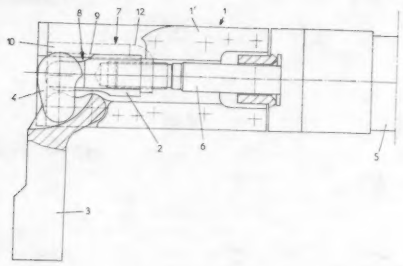
**Jean M. Bailis, Chatenois, and Georges Cretien, Belfort, both of France, assignors to Etudes Techniques-Franche-Comte-Alsace Etfa, Sarl, Belfort, France**

**Filed Dec. 3, 1984, Ser. No. 677,541**

**Claims priority, application France, Dec. 2, 1983, 83 19443**

**Int. Cl.[4] B23Q *3/03***

**U.S. Cl. 269—32** **4 Claims**



1. In a jointed pneumatic tightening apparatus comprising a clamping body (1) of two half-shells (1') joined to each other in which is slidably mounted a head (2) actuating a clamping arm (3) by means of a lever (4), the head (2) and lever (4) being pivotally interconnected about a first axis, the clamping arm (3) and lever (4) being pivotally interconnected about a second axis parallel to said first axis, and a jack (5) connected to the clamping body (1), and whose piston rod (6) is joined to the head (2) which is guided in the clamping body (1) against a bearing surface (7) of this latter, by means of an intermediate guiding element (8); the improvement in which the intermediate guiding element (8) is elastically deformable during gripping when said first and second axes are disposed in a plane perpendicular to said piston rod (6).

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**4,591,139**

## DEVICE FOR PICKING UP PLANAR WORK PIECES

**Wilhelm Engelbart, Sylt-Ost, Fed. Rep. of Germany, assignor to Maschinenfabrik Herbert Meyer KG, Munich, Fed. Rep. of Germany**

**Filed Oct. 4, 1984, Ser. No. 657,527**

**Claims priority, applicatior Fed. Rep. of Germany, Oct. 6, 1983, 3336426**

**Int. Cl.[4] B65H *3/20, 1/04***

**U.S. Cl. 271—9** **13 Claims**

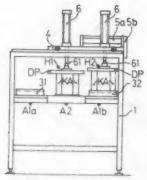
1. In an apparatus for picking up, transporting and exactly depositing planar workpieces having a selected shape from at least one first to a second deposition point wherein said apparatus includes:

a platform disposed over and bridging said deposition points;

lifting device means movably mounted on said platform for horizontal movement between said deposition points and for vertical movement between a raised position and a lowered position;

adhesive tape pick up means mounted on said lifting device means comprising a vertically disposed frame member having an upper and lower end, a baffle member having an aperture therein disposed on the lower end of said frame member, an adhesive tape winding means having adhesive tape deflection roller means associated therewith for receiving adhesive tape from said winding means, with said winding means and said associated roller means movably mounted in said frame member for vertical movement in said frame between an upper operating position and a lower operating position wherein said roller means are arranged on said winding means facing said aperture of said baffle member and protrude through said aperture when said winding means is in said lower operating position and said roller means are retracted with respect to said aperture when said winding means is in said upper position;

means for lowering said lifting device and means for lowering said winding means to said lower position at said first deposition point whereby said roller means protrude through said aperture and adhesive tape thereon picks up a work piece;



means for raising said lifting device and for transversely transporting said lifting device means to said second deposition point after said work piece has been picked up wherein said winding means and associated roller means remain in said lower position whereby said work piece remains adhered during said transport;

means for lowering said lifting device at said second deposition point and means for raising said winding means and said associated roller means to the upper position at said second deposition point whereby said roller means retract into said aperature and said work piece is released;

wherein the improvement comprises:

said lifting means comprise one horizontally oriented pressure plate selectively movable in the vertical direction wherein said pressure plate has an area defined by a first dimension in a first direction and by a second dimension in a second direction transverse to the first direction;

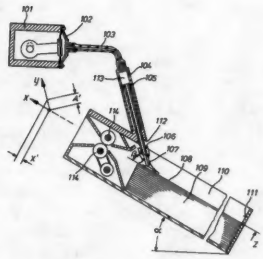
said adhesive tape pickup means comprises a plurality of independent units with the frame member of each unit defined by a vertically aligned tubular housing; and

fastening means for permitting selective movement of each tubular housing in both said first and said second directions of said one pressure plate and for detachably connecting each tubular housing to said pressure plate in a preselected desired arrangement whereby said plurality of independent functional units are arranged on said pressure plate to conform to the selected shape of said workpieces.

## 4,591,140
## ARRANGEMENT FOR SEPARATING AND TRANSPORTING UPPERMOST SHEETS OF A STACK OF SHEETS OR SHEET-LIKE OBJECTS

**Egon Illig, Stuttgart; Josef Gentischer, Weinstadt, and Wolfgang Schmutz, Rottweil, all of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Mar. 8, 1984, Ser. No. 588,131**
**Claims priority, application Fed. Rep. of Germany, Mar. 12, 1983, 3308867; Feb. 7, 1984, 3404215**
**Int. Cl.⁴ B65H *5/10***
**U.S. Cl. 271—11** **18 Claims**



1. An arrangement for separating and transporting uppermost sheets of a stack of sheets, comprising a suction mouthpiece to which a suction is applied for adhering an uppermost sheet thereto; a valveless pump connected with said mouthpiece by a connecting conduit and operable to generate a plurality of alternating pulsating positive and negative pressure phases; and a guide provided for guiding said suction mouthpiece in a predetermined direction, said pump imparting to said suction mouthpiece a lifting movement to lift said uppermost sheet from the stack by suction and also a pulsating movement according to said positive and negative pressure phases to shake off double sheets unintentionally pulled during the lifting movement of said suction mouthpiece and further to transport said sheet away from the stack, said guide maintaining said suction mouthpiece during said movement at an angle $\beta < 90°$ to an upper surface of the stack.

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## 4,591,141
## PIVOT POINT SHEET FEEDER

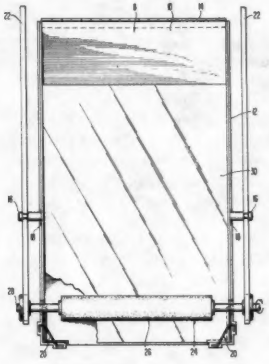
**Robert J. Wentzel, New Hyde Park, and Walter E. Tallman, North Babylon, both of N.Y., assignors to Burroughs Corporation, Detroit, Mich.**

**Filed Mar. 14, 1983, Ser. No. 474,878**
**Int. Cl.⁴ B65H *1/08***
**U.S. Cl. 271—127** **6 Claims**

1. A sheet feeder tray for maintaining a pressure between a feeder and a paper supply, said sheet feeder tray comprising:

inner tray means, pivotably supported in a semivertical position, for containing said paper supply, wherein said inner tray means includes a first flat rectangular back member, a first pair of sidewalls, one of said sidewalls extending from each side of said first rectangular back member, and a pair of pivot pins, one of said pivot pins rigidly connected to each one of said first pair of sidewalls; and

outer tray means, said inner tray means being hinged on said outer tray means at the top end of said inner tray means and nested in said outer tray means, said outer tray means for preventing the simultaneous feeding of multiple sheets of said paper supply, wherein said outer tray means includes a second flat rectangular back member, a second pair of side members extending perpendicular to said second flat rectangular back member one from each side of said second rectangular back member and thence continuing partially across an end of said second back member, and a pair of retaining members, one of said retaining members extending across a corner formed by each one of said second pair of side members,



wherein said first and second flat rectangular back members are hinged together at one of their respective ends and each one of said second pair of side members is cut out to accommodate one of said pivot pins as said inner tray means is rotated to a position where it is nested in said outer tray means.

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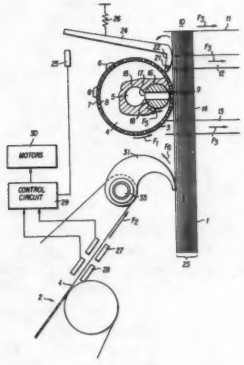
## 4,591,142
## STACKER FOR FLAT OBJECTS

**Michel Divoux, Bourg De Peage; Bernard Constant, Beaumont Les Valence, and Marcel Ranchon, Bourg-Les-Valence, all of France, assignors to Hotchkiss-Brandt Sogeme H.B.S., Paris, France**

**Filed Dec. 27, 1983, Ser. No. 565,816**
**Claims priority, application France, Dec. 30, 1982, 82 22071**
**Int. Cl.⁴ B65H *29/24, 31/04***
**U.S. Cl. 271—196** **6 Claims**




1. A stacker for flat objects moved in an edgewise manner by a conveyor, said stacker comprising:

(a) a fixed cylindrical body;

(b) a cylindrical drum:

(i) which is coaxial with and overlies said fixed cylindrical body;

(ii) which is mounted for rotation around said fixed cylindrical body; and

(iii) which has a plurality of circumferentially spaced radial through holes therethrough;

(c) first means for rotating said cylindrical drum;

(d) a cylindrical valve:

(i) mounted in said fixed cylindrical body for rotation about an axis which is parallel to the axis of said fixed cylindrical body and

(ii) having a diametric through slot sized, shaped, and positioned so that said through slot can be placed in fluid communication with said through holes in said cylindrical drum;

(e) second means for communicating vacuum to said through slot in said cylindrical valve when said through slot is in fluid communication with said through holes in said cylindrical drum;

(f) third means for rotating said cylindrical valve;

(g) fourth means for detecting the lead and trailing edges of flat objects being fed into peripheral contact with said cylindrical drum and for generating signals in response thereto; and

(h) fifth means for controlling the movement of said cylindrical valve in response to the signals generated by said fourth means.

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**4,591,143**

## APPARATUS AND METHOD FOR IN-REGISTER FEEDING OF SHEETS

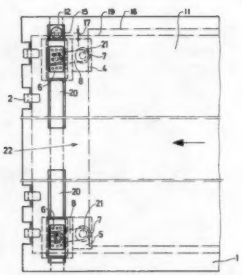
**Willi Jeschke, Heidelberg, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany**

**Filed Mar. 26, 1984, Ser. No. 593,647**

**Claims priority, application Fed. Rep. of Germany, Mar. 26, 1983, 3311197**

**Int. Cl.[4] B65H** *9/10, 9/06, 9/20*

**U.S. Cl. 271—227** **7 Claims**



**1**. Apparatus for in-register feeding a sheet into a sheet-processing machine by conveying the sheet in a given feed direction over a feed table, comprising front lays engageable by a leading edge of the sheet for aligning the leading edge of the sheet, a pair of side pull-type lays located in the feed table respectively on mutually opposite operator and drive sides of the feed table at a slight spacing from said front lays, both said side lays being movable in the plane of the feed table transversely to the given feed direction of the sheet, means for driving at least one of said side lays, positioning means having at least one sensor for controlling a displacement stroke of the driven side lay, air control means connected to a vacuum generator and to both of said side lays for controlling suction air flow to said side lays, at least one of said side lays having means for applying suction to the sheet until static friction is assured preparatory to aligning a respective lateral edge of the sheet, both of said side pull-type lays being driven so as to cover different placement strokes.

**4,591,144**

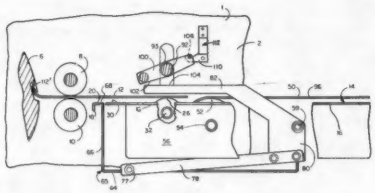
## FEEDER FOR PRESS

**Edward S. Godlewski, 129 S. Spruce St., Wooddale, Ill. 60691**

**Filed Jan. 28, 1985, Ser. No. 695,568**

**Int. Cl.[4] B65H** *9/06*

**U.S. Cl. 271—246** **20 Claims**



**14**. A feeding device for a printing press comprising infeed means on the press for drawing imprintable items into the press,

conveying means for feeding said items to said infeed means,

gate means interposed between said conveying means and said infeed means movable between stop and release positions for respectively holding said items from delivery to said infeed means and permitting delivery thereto,

means for operating said gate means for movement between said stop and release positions including disengageable driving and driven components,

said driving component having a stroke sufficient to move said gate means through said driven component to an intermediate partially release position and to impose an inertia moment on said driven component sufficient to cause said driven component to disengage from the driving component to move said gate means from said partially release position to a fully release position.

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**4,591,145**

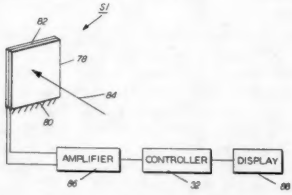
## SHEET TRANSPORT

**Abraham Cherian, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 22, 1985, Ser. No. 725,971**

**Int. Cl.[4] B65H** *7/06*

**U.S. Cl. 271—258** **10 Claims**




**1**. A sheet transport, including:

means for moving a sheet along a selected path; and

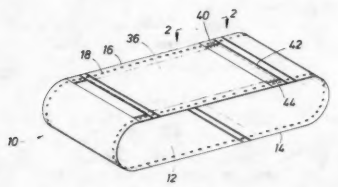
means, mounted with one end thereof fixed and the other end thereof free and positioned to have a generally planar surface thereof extending in a direction substantially transverse to the selected path of sheet movement, for generating an electrical signal in response to being bent by the sheet moving along the selected path.

4,591,146

## CONTINUOUS FEED DOCUMENT CARRIER

Bill J. Sasso, 8222 Furlong, Houston, Tex. 77071

Filed Dec. 28, 1984, Ser. No. 687,473
Int. Cl.[4] B65H 5/02
U.S. Cl. 271—275 9 Claims




1. A continuous feed document carrier, comprising;
(a) a flexible conveyor member having cooperative connection means, said conveyor member forming an endless loop conveyor upon locking said connection means;
(b) pocket means located on said conveyor member for receiving an end portion of a document therein, said pocket means including a registration edge defining the depth of said pocket means for abutment with the end of the document received therein for positioning and aligning the document on said conveyor member for subsequent printing thereon;
(c) alignment means for guiding said connection means into locking engagement to form said endless loop conveyor, said alignment means comprising an extension extending from one end of said conveyor member, said extension including a leading edge for abutment with said registration edge and having a length substantially equal to the depth of said pocket means; and
(d) traction means extending adjacent the longitudinal edge of said conveyor member to enable pulling said conveyor member through a printer.

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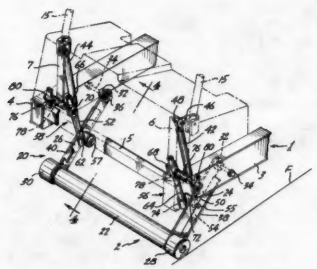
4,591,147

## SYSTEM FOR ELEVATING AN EXERCISE TREADMILL

David B. Smith, Mercer Island, and John M. Moore, Woodinville, both of Wash., assignors to Precor Incorporated, Redmond, Wash.

Filed Sep. 6, 1984, Ser. No. 647,548
Int. Cl.[4] A63B 23/06
U.S. Cl. 272—69 9 Claims



1. A system for elevating an exercise treadmill, said treadmill having a frame, said system comprising:
a support assembly having a pair of arms and a roller, said roller being mounted between first ends of said arms for contacting a surface upon which said exercise treadmill is positioned, said arms being pivotally connected at their opposite ends to said frame for swinging movement of said support assembly between a retracted position adjacent said frame and extended positions wherein said roller is positioned downwardly from said frame thereby raising said treadmill to desired elevations;
a pair of self-contained gas springs, one of said gas springs being pivotally connected at its lower end to one of said arms and the other one of said gas springs being pivotally connected at its lower end to the other one of said arms, the upper ends of said gas springs being connected to said frames; and
releasable locking means for selectively locking said support assembly relative to the frame at any desired position between the retracted and extended positions of said support assembly.

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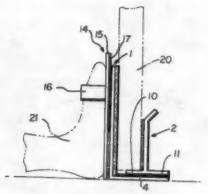
4,591,148

## PORTABLE CLAMP AND ANCHOR

Olin Slater, P.O. Box 1431, Augusta, Ga. 30906

Filed Jul. 6, 1984, Ser. No. 628,230
Int. Cl.[4] A63B 23/02
U.S. Cl. 272—93 4 Claims




1. A holddown device for a body member comprising a first element having a first surface, a first hook and loop fastener means comprising at least a portion of the first surface; a second element having a second surface, a second hook and loop fastener means matable with the first hook and loop fastener means comprising at least a portion of the second surface; said first element including at least one section positionable on one side of a fixed structure; said second element including at least one section positionable on the opposite side of said structure opposite said one side; said first hook and loop fastener means being adjustably fastenable to the second hook and loop fastener means so that the first element is connectable with the second element and adjustably positionable relative to the second element whereby the distance between the first element and the second element can be adjusted to accommodate fixed structures of various thicknesses; at least one of said first and second elements having means to engage and restrain the movement of a body member of an exerciser relative to said at least one of said elements.

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4,591,149

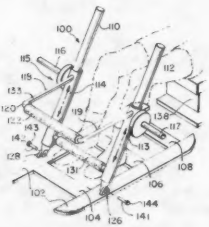
## WEIGHT LIFTING CALF EQUALIZER EXERCISING MACHINE

Daniel R. Godfrey, 3101 Bray Rd., Virginia Beach, Va. 23452

Filed Apr. 18, 1983, Ser. No. 486,115
Int. Cl.[4] A63B 21/06
U.S. Cl. 272—118 11 Claims

1. An exercise device for developing the muscles of a user, said exercise device comprising:
(a) a base support having a front end, a rear end, a bottom surface and a top surface;
(b) a pair of parallel handlebars, each of said handlebars having a lower end connected to the top surface of said base support and being disposed upwardly and rearwardly at an acute angle from said base support, each of said handlebars having a free upper end;
(c) a weight carriage comprising a pair of tubular sleeves, each sleeve being adapted to slide along a respective one of said handlebars, and a pair of outwardly extending,

substantially horizontal weight bars connected to said tubular sleeves, said weight bars comprising means for receiving standard lifting weights, said device further comprising a pair of horizontally disposed parallel rods connected to said tubular sleeves and extending towards the front end of said base support, said device also comprising a leg contact bar connecting said parallel rods to form a generally U-shaped upper bar, and a tubular lift bar connecting said tubular sleeves, said lift bar being adapted to be engaged by a portion of the body of a user; and



(d) weight resistance means adjustably connected to said weight carriage for opposing upward movement of said weight carriage.

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**4,591,150**

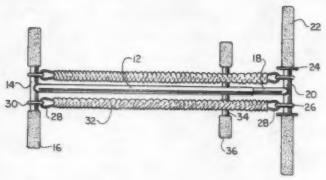
**EXERCISE DEVICE**

**Bruce A. Mosher, P.O. Box 1087, San Luis Obispo, Calif. 93406**

**Continuation-in-part of Ser. No. 503,804, Jun. 13, 1983, abandoned. This application Apr. 9, 1985, Ser. No. 721,490**

**Int. Cl.[4] A63B *21/02***

**U.S. Cl. 272—137** **3 Claims**



1. An exercise device characterized in that it can be used for rowing and archery exercises as well as for a wide variety of other exercises such as presses and curls, and further characterized in that its structure is intentionally not rigid so as to more closely simulate the use of free weights, said exercise device comprising in combination:

a first tubular longitudinal member having a first end and a second end;

a removable foot bar;

first means extending from the mid portion of said foot bar for pivotably connecting said foot bar to said first tubular longitudinal member for limited pivotal motion in a first plane containing said foot bar and said first tubular longitudinal member about an axis perpendicular thereto;

a second longitudinal member having a first end and a second end;

a removable hand bar;

second means extending from the mid portion of said hand bar for pivotably connecting said hand bar to said second longitudinal member for limited pivotal motion in a second plane containing said hand bar and said second longitudinal member about an axis perpendicular thereto;

said second longitudinal member slidably positioned within said first tubular longitudinal member with said first and second planes forming a single common plane;

elastic cable means extending from said foot bar to said hand bar with means for fastening said elastic cable means on each of said bars; and,

an auxiliary cross bar attached at its mid mportion to said first tubular longitudnal member near the second end of it, extending parallel to said foot bar, and located predominantly to one side of said first tubular longitudinal member so as not to interfere with said elastic cable means.

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**4,591,151**

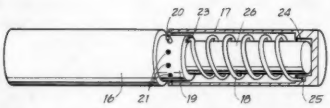
**TORSIONAL EXERCISE DEVICE AND METHOD OF USE**

**Virgil Hensley, 307 Lee Dr., O'Fallon, Ill. 62269**

**Filed Mar. 25, 1985, Ser. No. 715,899**

**Int. Cl.[4] A63B *21/02***

**U.S. Cl. 272—140** **8 Claims**



1. An exercise device comprising a pair of cylindrical handle grips wherein the first cylindrical handle grip is reduced via a shoulder to form a cylindrical shape of smaller diameter, said cylindrical shape having a plurality of holes in the circumference thereof and adjacent to the handle grip; said cylindrical shape further reducing via a second shoulder to form a cylindrical spindle; a torsion spring coaxially surrounding said spindle and having one end engaged in a notch or hole in said second shoulder adjacent to the cylindrical spindle; said second cylindrical handle grip being assembled coaxially in sleeve-like relation surrounding the cylindrical shape and cylindrical spindle of said first handle grip and having a slot partially extending around the circumference of said second handle grip near the end of said second handle grip surrounding said cylindrical shape of said first handle grip and in alignment with the plurality of holes in said cylindrical shape; a counterbore and a notch or hole at the end of said second handle grip opposite said slot; said counterbore engaging the free end of said cylindrical spindle in support thereof and said notch or hole engaging the second end of said torsion spring; and a torsional adjustment means comprising a separate pin being of a length approximating the diameter of the second cylindrical handle grip and of a diameter approximating the diameter of said plurality of holes in the cylindrical shape of the first cylindrical handle grip, said separate pin serving to hold said first and said second cylindrical handles in assembled condition, to maintain a desired tension in said torsion spring, and further permitting the second cylindrical handle grip to rotate with respect to said first cylindrical handle grip.

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**4,591,152**

**TOY COMPRISING INTERCONNECTING RODS**

**Clarence G. Ellwein, Spokane, Wash., assignor to Laura Ellwein; Mark D. Ellwein and Andrew G. Ellwein, all of Spokane, Wash., a part interest to each**

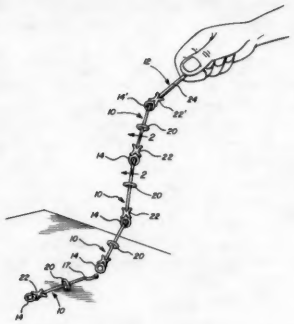
**Filed Oct. 26, 1983, Ser. No. 545,502**

**Int. Cl.[4] A63F *9/00***

**U.S. Cl. 273—1 GG** **12 Claims**

1. An amusement apparatus comprising a plurality of rod-like elements linked up serially into a chain by a user holding one element in his or her hand, having linked the one element to a second element of the chain, and repeated the link-up procedure with successive elements, each element having an

opening at one end and an elongate portion at the other end received through the opening of an adjacent element in the



chain to form an over-and-under connection between the elements.

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**4,591,153**

## ARRANGEMENT OF CONTROL MEMBERS, ESPECIALLY FOR APPARATUS FOR HEATING AND VENTILATING DRIVER'S CABS, PASSENGER COMPARTMENTS, ETC. IN COMMERCIAL VEHICLES

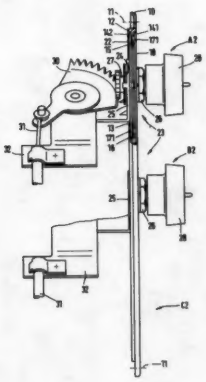
**Walter Krey, Mudau, Fed. Rep. of Germany, assignor to AURORA Konrad G. Schulz GmbH & Co., Mudau, Fed. Rep. of Germany**

**Filed Sep. 12, 1984, Ser. No. 649,860**

**Claims priority, application Fed. Rep. of Germany, Sep. 13, 1983, 3332984**

**Int. Cl.[4] B60H *1/02***

**U.S. Cl. 237—12.3 R** **11 Claims**



1. An arrangement of control members, with a plurality of control members being adapted to be held in place in a corresponding number of openings in a mounting plate having a display side and a rear side remote from said display side; said arrangement further comprising the following features;

said mounting plate having recesses provided thereon around the periphery of each of said openings, said recesses being spaced apart around a given opening at equal angular distances;

an indicating panel is associated with each of said openings on said display side of said mounting plate; and

a fixing piece is associated with each of said openings on said rear side of said mounting plate; each of said indicating panels and said fixing pieces is provided with an element which, in a number of angular positions relative to said mounting plate corresponding to the number of said recesses, permits a fixed allotment of said fixing pieces both relative to one of said indicating panels on one hand and relative to one of said control members on the other hand.

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**4,591,154**

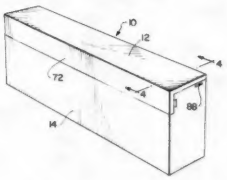
## PITCHING RUBBER AND HOME PLATE CONSTRUCTION

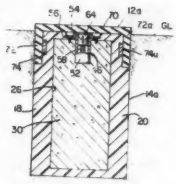
**Pasquale A. Santarone, 13415 Blenfield Rd., Phoenix, Md. 21131**

**Continuation-in-part of Ser. No. 514,663, Jul. 15, 1983, abandoned. This application Aug. 4, 1983, Ser. No. 520,310**

**Int. Cl.[4] A63B *71/00***

**U.S. Cl. 273—25** **15 Claims**





1. A pitching rubber assembly comprising;

(a) a casing adapted to be partially embedded in a pitching mound and being substantially flat with the ground at the upper end thereof;

(b) a pitching rubber adapted to be positioned at the top of said casing;

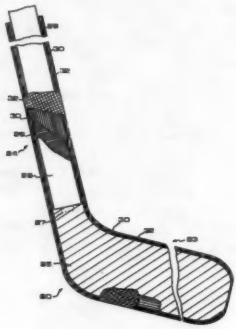
(c) guide means provided respectively on said casing and pitching rubber for cooperable engagement for precisely positioning said pitching rubber on said casing in a desired position, said guide means comprising guide ways formed in spaced relation in said casing, and runners on the interior surface of said pitching rubber, said runners being spaced commensurate with the spacing of said guide ways, whereby said pitching rubber, through alignment of said runners with said guide ways, is longitudinally slidable relative to said casing so as to position said pitching rubber in the desired position; and

(d) means for removably locking said pitching rubber on said casing, comprising a lock assembly mounted in one of said guide ways in said casing, said lock assembly including a resiliently biased plunger extending upwardly into said guide way, and a plunger-receiving recess formed in one of said runners provided on said pitching rubber, the position of said recess relative to said plunger being such that when said pitching rubber is longitudinally slidably moved along said casing to the desired position, said plunger is biased upwardly into said recess thereby locking said pitching rubber in place.

## 4,591,155
## METHOD OF MAKING HOCKEY STICKS

Yutaka Adachi, 77 Saskatoon Dr., Weston, Ontario, Canada M9P 2G1

Filed Mar. 5, 1985, Ser. No. 708,412
Int. Cl.[4] A63B *59/12*; B65H *81/00*
U.S. Cl. 273—67 A 14 Claims



1. A hockey stick having a handle portion and a blade portion;
where the cross-sectional profile of the handle is different from the cross-sectional profile of the blade both in breadth and thickness;
and having a transition portion whose cross-sectional profile changes smoothly and progressively from the profile of the handle to that of the blade;
where at least the handle portion is formed of at least three layers, the innermost of which comprises a plurality of strands which are disposed circumferentially around the profile and are packed closely together and parallel to each other;
the middle layer having a plurality of strands packed closely together and parallel to each other, and disposed lengthwise along said handle portion;
the outer layer having adjacent strands disposed in different directions to each other;
and where similar structures as to the second and third layers are also present over a core in the blade and transition portion of the hockey stick;
the second and third layers of said handle portion extending downwardly to said transition portion and forming a portion of the same layers thereof;
and where the fibres of said layers on said handle, blade and transition portions have been impregnated with a resin which has been permitted to cure while being compressed in a mould which defines the shape of the entire stick;
so that said hockey stick is integrally formed.

8. Method of making a hockey stick having a handle portion, and a blade portion, comprising the steps:
of providing a core for said handle portion and a separate core for said blade portion;
of enwrapping the core in a mat of fibres or strands;
where the mat is arranged in first, second and third layers in said handle portion and second and third layers in the said blade portion;
where, in the first layers, the strands are:
(a) packed tightly together;
(b) parallel to each other;
(c) touching each other along the lengths of the strands;
(d) disposed around the circumference of the core of said handle portion;
where, in the second layer for said handle and blade portions, the strands are:
(a) packed tightly together;
(b) parallel to each other;
(c) touching each other along the lengths of the strands;
(d) disposed along the length of the core of said handle portion and along the length of said core of said blade portion, where the strands of the second layer of said handle portion extend over at least a portion of the core of said blade portion;
where, in the third layer, adjacent strands are disposed in different directions to each other and cover the handle and blade portions of said hockey stick;
where the layers are arranged one inside the other with the first layer innermost and the third layer outermost, and each layer extends without interruption along at least a portion of the length of the core of said handle portion, and substantially completely around the circumference of the core; and each of the second and third layers of said handle portion extends along at least a portion of the length of said blade portion and around the circumference thereof;
followed by the further steps:
of impregnating the mat with resin;
of compressing in a press with impregnated mat onto the cores of said handle and blade portions, between moulds that define the shape of the integrally formed stick;
and of holding the mat compressed while the resin cures.

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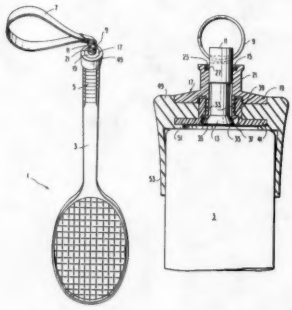
## 4,591,156
## REMOVABLE DEVICE FOR ATTACHING A RACKET TO A PLAYER'S WRIST

Maurizio Attenni, Via Monte Zebio, 32, Roma 00195, Italy

Filed Nov. 26, 1984, Ser. No. 675,242
Int. Cl.[4] A63B *49/08*
U.S. Cl. 273—73 J 8 Claims



1. Removable device for attaching a racket having a handgrip to a player's wrist, comprising a flexible strap adapted to encircle the player's wrist, a cap of elastic material adapted to be mounted grippingly on the end of the handgrip of a racket, female means carried by the cap, and male means carried by the strap and adapted to be releasably retained within said female means, said cap containing a rigid hollow insert providing said female means, said male means having two positions within said insert, in one of which positions said male means can be freely inserted into and withdrawn from said insert, and in the other of which positions said male means is secured in said insert.

**4,591,157**

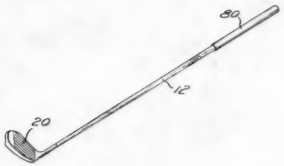
## GOLF CLUB SHAFT

**Richard E. Parente, Palm Springs, and Richard De LaCruz, Pauma Valley, both of Calif., assignors to Callaway Hickory Stick-USA, Inc., Carlsbad, Calif.**

**Continuation-in-part of Ser. No. 386,931, Jun. 10, 1982, Pat. No. 4,470,600. This application Sep. 4, 1984, Ser. No. 646,831**

**Int. Cl.[4] A63B** *53/02, 53/10*

**U.S. Cl. 273—80 B** **8 Claims**




2. A golf club shaft, comprising:

(a) an outer wood hollow tube having an interior bore from end to end, said wood tube tapering in its exterior diameter from its upper end to its lower end,

(b) and inner non-wood hollow tube positioned inside and closely fitting the interior of said outer tube throughout at least the major extent of the length of said outer tube,

(c) said inner non-wood tube having at least one step up in exterior diameter between its lower portion and its upper portion providing a less flexible portion above said step and a more flexible portion below said step, said less flexible portion having a uniform exterior diameter throughout at least the major extent of the length of said less flexible portion and said more flexible portion having a uniform exterior diameter throughout at least the major extent of the length of said more flexible portion,

(d) said outer wood tube being counter-reamed and creating a portion of greater interior diameter matching the location of said less flexible portion of said inner tube above said step and leaving a portion of lesser interior diameter not counter-reamed matching the location of said more flexible portion of said inner tube below said step, said portion of greater interior diameter having a uniform interior diameter at least the major extent of the length thereof, said portion of lesser interior diameter having a uniform interior diameter throughout at least the major extent of the length thereof.

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**4,591,158**

## REMOTELY CONTROLLED TOY GOLFER

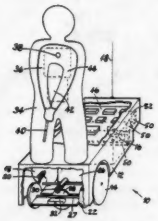
**Ronald Samson, 4 The Avenue, Blaby, Leicestershire, and Russel J. Packwood, Bedford, both of England, assignors to Ronald Samson, Leicestershire, England**

**Filed Sep. 22, 1982, Ser. No. 421,068**

**Claims priority, application United Kingdom, Sep. 22, 1981, 8128564**

**Int. Cl.[4] A63F** *7/06*

**U.S. Cl. 273—87.4** **17 Claims**



1. A remotely controlled toy comprising a mobile unit and a control unit, said mobile unit including a body structure, drive means in said body structure for driving said mobile unit, steering means carried by said body structure for steering said mobile unit, said body structure including a golfer figure, play means in the form of simulated golfer's arms, a golf club having a striking portion, said golf club being attached to said golfer's arms for engaging and moving a ball, pivot means pivotally mounting said golfer's arm on said golfer figure for enabling said golfer's arms and said golf club to pivot in a generally upright plane for swinging movement in an arc between first and second elevated angular positions and through an intermediate lowermost position to strike a ball positioned adjacent said mobile unit at one end of said mobile unit during said swinging movement, said body structure being beyond the path of said golf club, play actuating means connected to said play means for actuating said golfer's arms to pivot said golfer's arms and said golf club between said first and second elevated angular positions, and wherein said control unit has means for transmitting control signals to said mobile unit for controlling said drive means, said steering means and said play actuating means.

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**4,591,159**

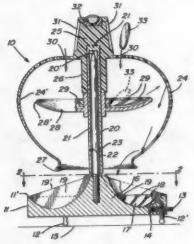
## WHIRLIGIG

**Attila Lehner, 80 Pine Ave., West - Apt. 1403, Montreal, Quebec, Canada H2W 1R1**

**Filed Oct. 18, 1985, Ser. No. 789,314**

**Int. Cl.[4] A63F** *5/04*

**U.S. Cl. 273—138 R** **9 Claims**



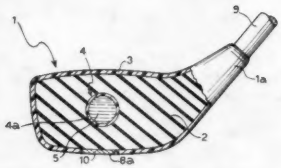
1. A game of chance for use with tokens and comprising a stationary base; leveling means to put the base in accurately horizontal position on a supporting surface; said base having a central hub and a trough surrounding the hub, spaced outwardly from the latter; at least two upright partitions disposed in said trough and defining at least two trough segments; a vertically-projecting spindle secured to said hub; a casing cover having a lowermost opening of a diameter less than the dimensions of said base; mounting means to rotatably mount said casing cover on the spindle; said casing cover being formed with an uppermost upwardly-projecting knob; a saucer disk secured to said mounting means at the general middle area of the casing and being of a lesser diameter than the inner horizontal diameter of the middle area; at least one slit formed in the top portion of said casing cover, whereby dropping a token through said slit onto said saucer disk and subsequently rotating said casing cover, causes the token to fly against the casing cover inside the latter by centrifugal force until a gradual slowdown in rotation of said casing cover allows the token to fall by gravity randomly into one of the segments.

4,591,160

## GOLF CLUB HEAD

Alessandro Piragino, Turin, Italy, assignor to 'Pininfarina S.p.A., Turin, Italy

Filed Mar. 16, 1984, Ser. No. 590,397
Claims priority, application Italy, Mar. 17, 1983, 53069/83[U]
Int. Cl.[4] A63B *53/04*
U.S. Cl. 273—167 R 4 Claims



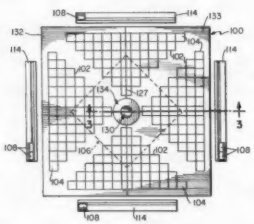

1. A golf club head comprising a shaped core body of materials selected from the group consisting of synthetic and natural rubber, a center core body having a substantially spherical shape embedded within said shaped core body and consisting of a closed envelope of plastic material completely filled with liquid, and an outer shell closely surrounding substantially the entire surface of said shaped core body, said shell being made of polymeric thermoplastic materials selected from the group consisting of polycarbonate, polyamide and polybutyleneterephthalate and having a hardness of at least 70 Shore D.

4,591,161

## METHOD AND APPARATUS FOR A GAME

John R. Vanderhoof, 200 E. 36th St., New York, N.Y. 10016

Continuation of Ser. No. 404,410, Aug. 2, 1982. This application Sep. 18, 1984, Ser. No. 652,223
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—272 11 Claims




1. An apparatus for playing a word game by a number of players, comprising:

a gameboard having a playing surface divided into a plurality of distinct word-building structures, said word-building structures having substantially identical size and shape and each being further subdivided into a plurality of playing spaces arranged in a grid shaped array, and

a plurality of distinguishable sets of word-forming playing pieces, the peices of one set being identifiable from the pieces of any other set so that each of the sets is adapted to be assigned to a player and is traceable to said player during and after game play, each playiny piece displaying a single alphanumeric character of a spoken language in which the word game is to be played, and dimensioned for placement within one of said playing spaces, each of said distinguishable sets containing the same number of playing pieces displaying alphanumeric characters as the number of playing spaces in any one of said word-building structures, each said set comprising substantially all the alphabetic letters of said spoken language, and having the same distribution of alphanumeric characters among said playing pieces.

4,591,162

## DECK OR PACK OF CARDS FOR PLAYING MULTIPLE LOTTERY GAMES

Joseph I. Fakhoury, 4640 N. Central Park, Chicago, Ill. 60625

Continuation-in-part of Ser. No. 565,701, Dec. 27, 1983, abandoned. This application Oct. 4, 1984, Ser. No. 657,682
Int. Cl.[4] A63F *1/04*
U.S. Cl. 273—303 10 Claims

1. A deck of cards for playing multiple lottery games with which forecasts of game results may be made upon random principles corresponding to those on which the actual winning numbers are drawn comprising:

a full set of cards including at least forty cards, said full set of cards displaying a first, non-repeating group of numbers from a low of "01" to a high of "40";

suit marking means for subdividing and classifying at least some of said full set of cards into a plurality of separate suits equal to a multiple of ten, each suit having the same number of cards displaying a second group of numbers comprising ten digits "0" through "9" repeated identically on the cards in each suit;

whereby one lottery game may be played by randomly picking cards from said full set to make selections from said first group of numbers; and

whereby further secondary lottery games may be played by randomly picking cards from predetermined ones of said suits to make selections from said second set of numbers.

4,591,163

## MARBLE TOSSING GAME

Tony Reyes, Jr., 4111 Holiday Pl., Oklahoma City, Okla. 73112

Filed Aug. 28, 1984, Ser. No. 645,167
Int. Cl.[4] A63F *7/02*
U.S. Cl. 273—401 1 Claim

1. A method of playing a game for opposing players comprising the steps of:

(a) providing an equal plurality of marbles of a selected diameter for each of said players; p1 (b) providing a pitching hole comprising a block having a generally hemispherical depression with a radius greater than the total of the diameters of a number of marbles less than said plurality of said marbles;

(c) collecting an equal plurality of marbles from each player and placing all said marbles collected in the hand of a first of said opposing player;

(d) declaring by said first player whether the number of marbles remaining in said pitching hole will be odd or even;
(e) said first player tossing said collected marbles into said pitching hole from a preselected distance;
(f) allowing said tossed marbles to come to rest;
(g) determining whether the number of marbles remaining in said pitching hole is odd or even or zero; p1 (h) if the number of marbles remaining is zero, repeating steps d through g with the marbles collected in step c;

(i) if the declaration of said first player is the same as the number (odd or even) of marbles determined in step g, giving all the marbles collected in step c to that player and repeating steps c through i;
(j) if the declaration of said first player is different from said number (odd or even) of marbles determined in step g giving the marbles to a second, opposing, player and repeating steps c through j by said second player; and
(k) repeating steps c through j until one player has all the marbles.

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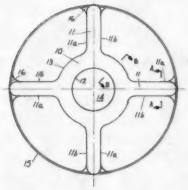
**4,591,164**

## BOOMERANG

**Marshall R. Blight, Nedlands, Australia, assignor to Emeraldine Limited, London, England**

**Continuation of Ser. No. 454,063, Dec. 28, 1982, abandoned. This application Jan. 30, 1985, Ser. No. 696,870**
**Claims priority, application Australia, Apr. 29, 1982, PF3793; Jul. 16, 1982, PF4902**
**Int. Cl.[4] A63B *65/08***
**U.S. Cl. 273—425** **4 Claims**



1. A substantially flat boomerang device comprising a flat central ring member having inner and outer substantially circular boundaries and defining a central aperture, at least two wing members projecting outwardly from the outer boundary of the central ring member substantially in the plane thereof, each wing member being of asymmetrical aerofoil section and being arranged to act in the same direction as all of the other wing members, such that when the device is thrown with a rotary motion the wing members produce lift and also turn, the central ring member being of symmetrical aerofoil section and the symmetrical aerofoil shape being on the side of the central ring member such as to augment lift produced by said wing members in flight, and said wing members being all of the same length and having outer ends interconnected by a circular outer ring member, at least the trailing sides of the junctions between each of the wing members and the outer ring member being provided with a flat, drag-geducing skirt extending between a side of the wing members and adjacent sides of the outer ring member.

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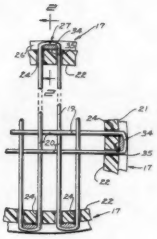
**4,591,165**

## RACKET HAVING STRINGS WHICH PASS OVER ROCKABLE TENSION TRANSMITTING MEANS

**Randy D. Sines, Oxnard, and Bruce W. Farber, Oak View, both of Calif., assignors to Karakal Corp. of the Americas, Oxnard, Calif.**

**Filed Nov. 14, 1984, Ser. No. 670,402**
**Int. Cl.[4] A63B *49/00***
**U.S. Cl. 273—73 D** **8 Claims**



1. A sports racket comprising:
an elongated handle;
a head frame at an end of the handle forming a planar string opening;
wherein the head frame includes a peripheral outward facing surface substantially perpendicular to the planar string opening and an inside surface defining the opening;
a first group of substantially parallel string holes adapted to loosely receive a racket string, formed through the head frame and oriented in a first direction with respect to the elongated handle;
a second group of substantially parallel string holes formed through the head frame and oriented transversely with respect to the first direction and adapted to loosely receive a racket string; and
rocker means contacting the peripheral outward facing surface and located between at least two adjacent string holes of at least one of the groups and rigid in a plane parallel to the string holes, for contacting the peripheral outward facing surface of the head frame along a single line of rocking contact perpendicular to the string holes and parallel to a plane tangential to the outward facing surface, and having an outward string receiving surface thereon adapted to receive and guide a racket string through the two adjacent string holes, forming two parallel string chords extending across the string opening, for transferring tension applied to one of the string chords to the remaining string chord by rocking along the single line of rocking contact at the peripheral outward facing surface of the head frame.

4,591,166

## GASKET AND PROCESS OF MAKING GASKETS FROM EXFOLIATED GRAPHITE

Alan W. Atkinson, Rochdale; Katryna J. Dearden, Littleborough; Christina Doyle, Cranleigh; Janet M. Lancaster, Littleborough; Kenneth H. Marshall, Maidenhead, and Kay L. Robinson, West Drayton, all of England, assignors to T & N Materials Research Limited, Manchester, England

Filed Sep. 29, 1983, Ser. No. 691,521

Claims priority, application United Kingdom, Oct. 1, 1982, 8228154

Int. Cl.[4] C01B *31/04;* F16J *15/12;* F02F *11/00;* B32B *3/12*

U.S. Cl. 277—1 13 Claims

1. A method of making a gasket from exfoliated graphite, by a process including the steps of

(a) embossing the gasket to form a relief pattern comprising raised areas surrounded by predominantly interconnected depressed regions, and thereafter

(b) coating the thus embossed gasket with a silicone rubber.

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4,591,167

## SLIDE RING SEAL WITH PRE-CONTOURED BELLOWS

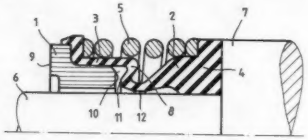
Paul Vossieck, and Karl vom Stein, both of Burscheid, Fed. Rep. of Germany, assignors to Goetze AG, Burscheid, Fed. Rep. of Germany

Filed Oct. 4, 1985, Ser. No. 784,266

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1984, 3436798

Int. Cl.[4] F16J *15/36*

U.S. Cl. 277—88 14 Claims




1. Slide ring seal for sealing a machine component relative to a pressurized media, comprising:

a slide ring axially slidably mountable on a machine component;

a bellows arranged for surrounding an axial portion of the machine component and having one axial end connected with said slide ring and a second axial end, said bellows including a sealing means at said second axial end for sealing the machine component with respect to the pressured media, said bellows having a region between said slide ring and said sealing means which, in a relaxed state of said bellows, has a shape approximately corresponding to the contour of said region that will develop when said bellows is subjected to operating pressures in an installed state of said slide ring seal; and

a compression spring arranged to be concentrically mounted on the machine component with respect to said slide ring and said bellows and disposed between said slide ring and said sealing means.

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4,591,168

## SEALING RING HAVING TORSION RIBS

Helmut Hölzer, Weinheim, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim, Fed. Rep. of Germany

Filed Nov. 27, 1984, Ser. No. 675,131

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1984, 3402109

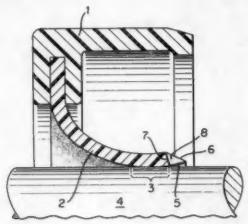
Int. Cl.[4] F16J *15/32*

U.S. Cl. 277—134 22 Claims

1. A sealing ring for sealing a liquid about a relatively-rotating member, comprising:

an annular sealing ring having a root surface about an edge of the sealing ring adjacent a flarable, substantially-smooth sealing-surface zone of the sealing ring for slidingly-engaging the member; and

torsion ribs projecting from the root surface and each having an inside surface which is a regular prolongation of the sealing-surface zone, whereby the torsion ribs separate




from the member at a small angle, and an opposite, outside surface the distance between which and the inside surface diminishes with increasing distance from the root surface, whereby to avoid rib-deforming force from the liquid upon the relative rotation of the member.

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4,591,169

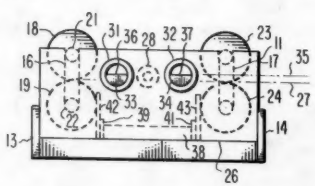
## SEAL ARRANGEMENT FOR RETAINING A LIQUID LEVEL ABOVE A STRIP PASSING THROUGH A CHAMBER

Russell G. Raush, Conestoga, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Jun. 19, 1985, Ser. No. 746,310

Int. Cl.[4] F16J *15/40, 15/48*

U.S. Cl. 277—135 8 Claims




1. A seal arrangement for retaining liquid in a chamber at a level higher than a portion of the sides of said chamber, said chamber including two substantially parallel high sides having a height greater than the desired level of said liquid, and two substantially parallel low sides having a height less than the desired level of said liquid, said high and low sides being attached to a bottom section, said seal arrangement comprising:

a first and a second pair of rollers supported by said high sides, the rollers in each pair being in contact at a height higher than the height of said low sides whereby a sheet of material can pass between said rollers above said low sides, each pair of rollers having an upper roller and a lower roller, said lower roller being spaced a predetermined distance above the bottom of said chamber, said first and second pairs of rollers being horizontally spaced along said high sides with said rollers being substantially parallel to said low sides, said rollers having a length substantially equal to the length of said low sides;

first and second seal members fixed to the bottom section of said chamber, said seal members having a height exceeding said predetermined distance and a length substantially equal to the length of said rollers, said first and second seal members engaging said lower rollers of said first and second pairs respectively; and

means for supplying liquid between said seal members whereby liquid pressure biases said seal members against said lower rollers and said liquid is confined between said pairs of rollers.

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**4,591,170**

## CYLINDER HEAD GASKET HAVING METAL CORE WEB WITH HOOKS

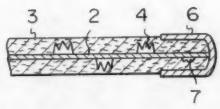
**Norihiko Nakamura, Mishima; Kenichi Nomura, and Mamoru Yoshioka, both of Susono, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed May 3, 1985, Ser. No. 730,293**

**Claims priority, application Japan, Jun. 25, 1984, 59-094895[U]**

**Int. Cl.⁴ F16J *15/12***

**U.S. Cl. 277—235 B** **2 Claims**




1. A cylinder head gasket adapted for arrangement between a cylinder head and a cylinder block in an internal combustion engine for sealing a combustion chamber formed between a recess in the cylinder head, cylinder bores in the cylinder block, and pistons arranged in the cylinder bores, said cylinder head gasket comprising:

a pair of gasket plates made of heat-resistant elastic material, and placed adjacent to the cylinder head and the cylinder block, respectively;

a core web made of metal material arranged between the face sides of the gasket plates, said gasket plates and said core web having openings aligned to correspond with the cylinder bore; and

grommet rings having a substantially U-shaped cross-section fitted in the edges of the aligned openings of said gasket plates and said core web;

the core web having a plurality of first hooks capable of contacting the gasket plates in such a manner that the first hooks are engaged with said gasket plates and arranged evenly along the entire surface of both sides of the core web and facing the gasket plates except in the area located adjacent to the inner periphery of the openings and substantially inside of the grommet rings, in which area the core web has only second hooks having a reduced height as compared with the height of the first hooks, such that the second hooks are spaced away from contact with the grommet rings.

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**4,591,171**

## SEAL FOR AIR CHARGING A CHUCK

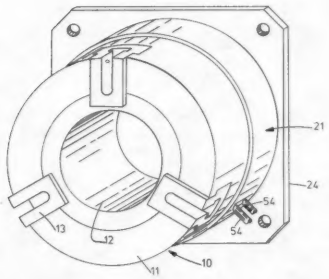
**William Stone, East Jordan, Mich., assignor to Sheffer Collet Company, Traverse City, Mich.**

**Filed Mar. 2, 1984, Ser. No. 585,367**

**Int. Cl.⁴ B23B *31/30***

**U.S. Cl. 279—4** **2 Claims**

1. Means for intermittently delivering air under pressure to a rotatable chuck having an internal air operated mechanism, said chuck having at least a portion of its exterior surface formed as a smooth circular surface, said means characterized in that said surface has an air receiving channel, an annular stationary housing concentrically surrounding said surface, the inner surface of said housing having axially spaced recesses opening through the inner radial face thereof; a ring element between each of said recesses and forming the side walls thereof; said side walls having axially extending ridges intermediate the inner and outer radial ends thereof and forming circumferential axially recessed anchor pockets radially outwardly thereof; an annular seal of generally U-shaped cross section having radially outwardly extending parallel legs and a radially inwardly facing web seated in each of said recesses; said legs at their radial outer ends having circumferential axially extending lips, said lips each being seated in one of said anchor pockets for forcibly holding said legs against any radial movement other than as the result of flexing; said seal being of an elastic material having memory and said web of said seal member when retracted being generally flat and flush with the radially inner surface of said housing; the side walls of said recesses between said ridges and the inner radial face of said housing being axially spaced from the adjacent portions of the legs of said seals whereby said legs are free of frictional restriction against elongation and retraction and have freedom for limited axial flexure; means for positively locking the elements of said stationary housing in position concentric with said chuck; port means for introducing air under pressure into the interior of said seals for forcing the webs thereof to shift into sealing contact and form an air tight seal with said surface of said chuck on both sides of said channels; the centers of said webs being stiffened and the portions of said seals joining said central portions of said webs and said sides being more flexible than said centers of said webs whereby the webs as they move in response to air pressure substantially maintain their flat inner surface configuration; an opening through each of said webs aligned with said channels in said surface, said openings having an air flow capacity substantially less than that of said port means.

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**4,591,172**

## POWER CHUCK

**Karl Hiestand, Pfullendorf, Fed. Rep. of Germany, assignor to SMW Schneider & Weisshaupt GmbH, Fed. Rep. of Germany**

**Filed Sep. 28, 1983, Ser. No. 536,446**

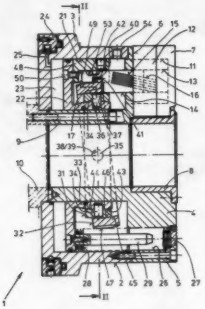
**Claims priority, application Fed. Rep. of Germany, Oct. 9, 1982, 3237521**

**Int. Cl.⁴ B25B *31/10***

**U.S. Cl. 279—1 J** **16 Claims**

1. A power chuck particularly for turning machines, comprising a chuck body, a plurality of clamping jaws guided in said body for radial displacement outwardly and inwardly, said chuck body having grooves along which said jaws are guided, a plurality of drive members arranged in said body each adjacent one of said jaws and each being displaceable in an axial direction and having an oblique surface engaging a respective jaw so as to move said jaws radially upon axial displacement of said drive members, an actuating member axially movable in said chuck for moving said drive members, and two pivotally mounted gimbal rings connected between all of said drive members and said actuating member for moving said drive members and providing compensation for unequal displace-

ment of said jaws; said two gimbal rings being mounted one within the other with the inner one being hinged to the actuating member and to the outer gimbal ring, said outer gimbal ring being positively connected to said drive members.



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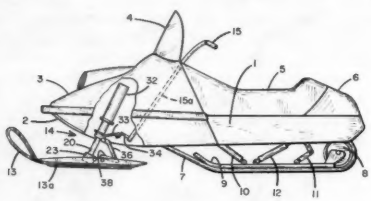
**4,591,173**

## SUSPENSION AND STEERING MECHANISM FOR A SNOWMOBILE

**Gregory J. Marier, Brooklyn Park, Minn., assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**

**Filed Sep. 24, 1984, Ser. No. 653,291**
**Int. Cl.[4] B62B *17/04***
**U.S. Cl. 280—21 R** **6 Claims**



1. A steering and suspension mechanism for a snowmobile comprising:

(a) tubular sleeve means affixed to the frame of said snowmobile in a generally vertical orientation;

(b) a strut having a portion thereof held within said tubular sleeve means so that it is both rotatably and axially movable;

(c) at least one steering ski attached to the lower end of said strut;

(d) a steering arm disposed coaxially with said strut and made swingable about said strut in association with a steering handle;

(e) a connecting arm;

(f) means for pivotally securing one end of the connecting arm to said steering arm for permitting movement of said connecting arm in a generally vertical plane relative to said steering arm;

(g) a guide rail attached to said steering ski;

(h) a sliding member in slidable engagement with said guide rail; and

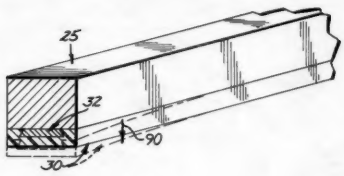
(i) means securing said connecting arm to said sliding member whereby the lower end of said connecting arm is secured to said steering ski in a longitudinally slidable manner.

**4,591,174**

## SNOW SLIDER REPLACEMENT SYSTEM AND METHOD

**Gilbert T. White, Rte. 1, Box 670, Grand Marais, Minn. 55604**

**Filed Jan. 6, 1984, Ser. No. 568,589**
**Int. Cl.[4] B62B *17/02***
**U.S. Cl. 280—28** **15 Claims**



1. A system for quickly and replaceably securing snow surface sliders to a sled runner which has a longitudinally extending straight main portion and an upwardly curved front end portion, the surface slider securing system comprising:

slide rail means fixedly secured to a sled runner to extend longitudinally along a bottom surface of the curved front and main portions thereof, the slide rail means including a longitudinally extending first rail dovetail portion extending downwardly therefrom;

a surface slider removably mounted to the slide rail means, the surface slider having a longitudinally extending second slider dovetail portion extending upwardly therefrom of configuration to mate with the first rail dovetail portion in lateral cross-section to permit longitudinally slidable movement of the surface slider with respect to the sled runner, the surface slider having a ground cover contacting surface extending along a bottom side thereof and the dovetail portion of the surface slider being resilient so that the surface slider is removable from the slide rail means by peeling the surface slider laterally away from the slide rail means without permanently deforming the dovetail portions of the surface slider and slide rail means to an extent which prevents remounting of the surface slider on the slide rail means; and

releasable means operative on front end portions of the sled runner and of the surface slider proximate only an upper end of the curved front portion of the sled runner for preventing longitudinal movement of the surface slider with respect to the sled runner.

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**4,591,175**

## SHOPPING CART ANTI-THEFT APPARATUS

**Gene Upton, Mission Viejo, and Dennis Brown, Lemon Grove, both of Calif., assignors to Kart Guard Internationale, Inc., San Diego, Calif.**

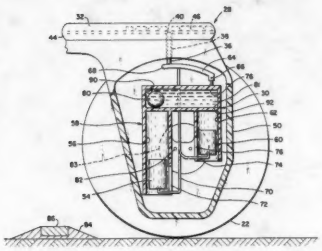
**Continuation-in-part of Ser. No. 434,941, Oct. 18, 1982, abandoned. This application Feb. 22, 1984, Ser. No. 582,532**
**Int. Cl.[4] B62B *5/04***
**U.S. Cl. 280—33.99 C** **25 Claims**

1. Anti-theft apparatus for use on a cart, said cart having swivel casters associated with its wheels to allow for turning movement of the cart, said anti-theft apparatus comprising:

locking means for association with one of said swivel casters, said locking means including a locking member movable between a release position and a locking position in which it locks said swivel caster against movement into a position which allows said cart to travel in a straight line, whereby the cart can only travel in a circular path; and

actuating means associated with said locking member, said

actuating means including magnetic means adapted to be actuated when the wheel associated with said swivel



caster passes over a magnetic barrier means to urge said locking member into said locking position.

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**4,591,176**

## LOCKING MECHANISM FOR PUSH-ROD OF BABY CARRIAGE

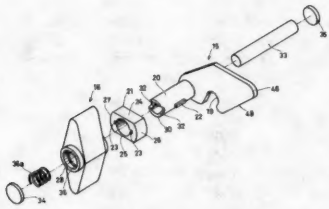
**Kenzou Kassai, Osaka, Japan, assignor to Aprica Kassai Kabushikikaisha, Osaka, Japan**

**Filed Dec. 10, 1984, Ser. No. 680,275**

**Claims priority, application Japan, Dec. 26, 1983, 58-204643[U]**

**Int. Cl.[4] B62B *9/20***

**U.S. Cl. 280—47.36** **4 Claims**



**1.** In a locking mechanism for fixing a push rod **(12)** of a baby carriage in its face-to-back push state and also in its face-to-face push state, having a hook **(15)** turnably attached to said push rod **(12)** and having an engagng recess **(19)** adapted to fit on engaging pins **(17, 18)** erected on the baby carriage, and a knob **(16)** turnably attached to said push rod **(12)** so as to make it possible to rotate said hook **(15)**, the improvement comprising a combination of an engaging projection **(31)** and an engaging recess **(32)** for engaging said hook **(15)** and said knob **(16)** with each other, said knob **(16)** being slidable along the axis of rotation of said hook **(15)**, spring means **(36*a*)** for constantly urging said knob **(16)** toward said hook **(15)**, so that when said knob **(16)** is slid until it approaches said hook **(15)**, said engaging projection **(31)** and said engaging recess **(32)** engage each other, wherein when said engaging projection **(31)** and said engaging recess **(32)** engage each other and when the rotation of said hook **(15)** is not inhibited, the rotation of said knob **(16)** causes said hook **(15)** to rotate in response to the rotation of said knob **(16)**, while when said engaging projection **(31)** and said engaging recess **(32)** engage each other and when the rotation of said hook **(15)** is inhibited by said engaging pin **(17 or 18)**, the rotation of said knob **(16)** results in said knob **(16)** sliding away from said hook **(15)** against the force of said spring means **(36*a*)**, whereby the engagement between said engaging projection **(31)** and said engaging recess **(32)** is canceled.

**4,591,177**

## OLEODYNAMIC STEERING CONTROL DEVICE

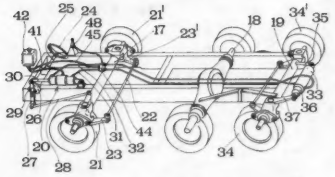
**Roberto Perlini, 37047 San Bonifacio-Locara (Verona), Italy**

**Filed Apr. 2, 1984, Ser. No. 596,051**

**Claims priority, application Italy, Jan. 19, 1984, 67052 A/84**

**Int. Cl.[4] B62D *7/00***

**U.S. Cl. 280—91** **11 Claims**



**1.** An oleodynamic steering control device for steering pivotable wheels of motor vehicles provided with an automatic straight traveling stabilizer and an oleodynamic steering actuator connected by a double hydraulic circuit to said control device, said control device comprising a substantially cylindrical member and a chamber of variable volume within said member for slidably receiving a piston, said piston occupying a center position in said substantially cylindrical member in the straight traveling attitude and being responsive to changes in the traveling direction of the vehicle, characterized by a fluid by-pass to a reservoir in said center position and in the vicinity thereof adapted to relieve fluid pressure for any movement of said piston in said center position and said vicinity thereof, said by-pass comprising an annular chamber provided at the periphery of said piston and communicating with opposite surfaces of said piston through ports provided therein and adapted to be closed by caps biased by springs axially supported by said piston and a fluid flow port disposed adjacent a center line of said substantially cylindrical member and communicating with a conduit leading to said reservoir.

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**4,591,178**

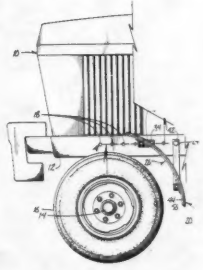
## QUICK ATTACH FENDER AND METHOD FOR USING SAME

**Eugene S. Mortvedt, and Eugene M. Boster, both of Story City, Iowa, assignors to Genes' Enterprise Corp., Story City, Iowa**

**Filed Jul. 12, 1984, Ser. No. 630,235**

**Int. Cl.[4] B62D *25/16***

**U.S. Cl. 280—154** **6 Claims**



**1.** A quick attach fender for a vehicle having a vehicle frame, a wheel axle connected to said vehicle frame, and a wheel rotatably mounted to said axle, said fender comprising:

stationary bracket means adapted to be mounted to said vehicle frame, said bracket means having at least two horizontally extending shafts which extend from said

vehicle frame toward said wheel, and which terminate in shaft ends;

shield means comprising a flat sheet member having opposite ends and opposite sides and a shield frame attached to said sheet member, said shield frame having at least two sleeve members sized and positioned to telescopically slide over said shaft ends of said horizontally extending shafts of said bracket means whereby said shield frame and said bracket means will cooperate to support said sheet members in at least partial covering relation over said wheel;

securing means detachably engaging said sleeve members and said horizontal shafts to permit selective attachment and detachment of said sleeve members to said shaft;

said shield frame comprising at least two elongated spaced apart parallel rigid strap members each being attached to said two sleeve members in perpendicular relationship thereto, said strap members being arcuate along their lengths and being positioned in approximately concentric relation to said wheel;

said sheet member being made from a flexible material which will resiliently deflect and return to its original shape in response to impacting forces, said sheet member being attached to said spaced apart rigid strap members with said strap members being positioned in inward spaced relation from said opposite sides and opposite ends of said sheet members whereby said opposite sides and opposite edges of said sheet member are free for limited deflection in response to being exposed to impacting forces.

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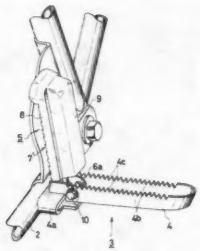
**4,591,179**

**BAR STEPS FOR A SMALL-SIZED VEHICLE**

**Nagatoshi Nakamura, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 31, 1984, Ser. No. 616,008**
**Claims priority, application Japan, Jun. 4, 1983, 58-98788**
**Int. Cl.[4] B62J *25/00***
**U.S. Cl. 280—291** **12 Claims**



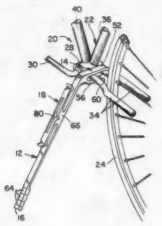
1. Bar steps of a small-sized vehicle of the type that a rider rides the vehicle by straddling a vehicle body frame and a seat, which bar steps are provided in association with underframes of the vehicle body frame in order that the rider can place his right and left feet thereon, characterized in that each of said bar steps comprises a step main body provided in association with the underframe and having a teeth-shaped configuration on its top surface, and a cover member including an elastic piece as a part thereof which is swingably mounted in association with said step main body, and said cover member can be arbitrarily swung between a position for covering the step main body and a retracted position where the cover member is erected to incline toward the vehicle body frame.

**4,591,180**

**PORTABLE BICYCLE STAND**

**Rebecca Copple, 4927 Walker Ave., #1, Lincoln, Nebr. 68504**

**Filed Jan. 23, 1985, Ser. No. 694,109**
**Int. Cl.[4] B62H *1/00***
**U.S. Cl. 280—293** **5 Claims**



1. A portable bicycle stand for supporting a bicycle having a frame in an upright position, the bicycle stand comprising:

an elongated support leg which defines a longitudinal axis;

first means carried by the support leg for detachably mounting the support leg on a frame of a bicycle in a support position such that the support leg extends from the frame to engage the ground and support the bicycle in an upright position relative to the ground, the first means including a cooperating finger and thumb extending from a first end of the support leg and defining a recess therebetween configured to receive, in releasable locking engagement, portions of the frame of the bicycle, such that a second end of the support leg is directed downwardly from the frame into engagement with the ground, the finger and thumb being constructed of resilient material and obtusely disposed with respect to the support leg longitudinal axis and the finger and thumb being substantially parallel with the thumb being shorter than the finger; and

second means carried by the support leg for detachably mounting the support leg on the frame of the bicycle in a storage position such that the support leg is secured with respect to the frame of the bicycle in an out-of-the-way location for storage and transport.

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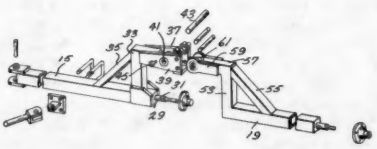
**4,591,181**

**HINGE-WING DRAWBAR MECHANISM**

**Paul C. Gutschmidt, Devils Lake, N. Dak., assignor to Summers Mfg. Company, Inc., Maddock, N. Dak.**

**Continuation of Ser. No. 496,354, May 19, 1983, abandoned. This application Aug. 30, 1985, Ser. No. 771,155**
**Int. Cl.[4] A01B *59/042***
**U.S. Cl. 280—476 R** **7 Claims**



1. A hinge-wing drawbar device comprising:

a first internal drawbar adapted to have secured thereto an implement to be drawn by said drawbar;

a second external wing drawbar substantially aligned with said internal drawbar and adapted to have secured thereto an implement to be drawn by said external drawbar;

a first support wheel rotatably mounted on said internal drawbar between said internal and said external drawbar and a second support wheel rotatably mounted on said

external drawbar, said first support wheel having its axis of rotation aligned with the axis of rotation of said second support wheel and in parallel with the longitudinal axis of said internal and said external wing drawbars; and

means for flexibly connecting said external wing drawbar to said internal drawbar including a first support member fixedly secured to said first internal drawbar and extending upwardly therefrom above said support wheel, said support member having a pin receiving aperture, a second support member fixedly connected to said external wing drawbar and extending upwardly therefrom from a first height insufficient to provide clearance for said first support wheel to a second height sufficient to provide clearance for said first support wheel, said second support member having a portion at said second height extending substantially horizontally toward said first support member and over said first support wheel and having a pin receiving bearing aligned with said aperture, a pin being positioned in said aperture and through said bearing for connecting said external wing drawbar to said internal drawbar, said external wing drawbar being rotatable in a vertical plane with respect to said internal drawbar.

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**4,591,182**

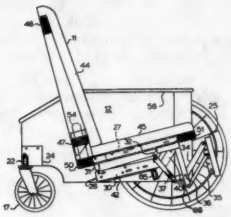
## RECLINER WHEELCHAIR

**Francis W. Wood, Rte. 1 Box 76, Weyer's Cave, Va. 24486**

**Filed May 2, 1984, Ser. No. 606,294**

**Int. Cl.[4] B62M *1/14***

**U.S. Cl. 280—647** **17 Claims**



1. A wheelchair which comprises a reclining chair mounted on a recliner mechanism, a relatively large wheel on each side of said chair, each said wheel including axle means, a rigid chassis which is of "H" configuration as seen in plan and is so constructed and arranged that two of its legs are inclined forwardly and upwardly and carry said axle means and the other two of its legs are horizontal and carry said recliner mechanism, a brace being provided between each said upwardly inclined leg and the corresponding said horizontal leg, said horizontal leg being rigidly connected on their undersides to a transverse bar and said upwardly inclined legs being connected to the forward side of said bar at their rear ends, side arm panels being mounted on the outboard sides of said horizontal legs and said recliner mechanism being connected to the inboard sides of said horizontal legs.

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**4,591,183**

## LUGGAGE CARRIER

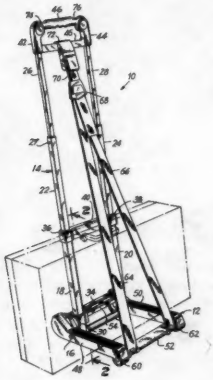
**Michael Gordon, New York, and John R. Curreri, Bellmore, both of N.Y., assignors to Christian Dior, S.A., Paris, France and Koret, Inc., New York, N.Y.**

**Filed May 8, 1984, Ser. No. 608,149**

**Int. Cl.[4] B62B *1/04***

**U.S. Cl. 280—655** **12 Claims**

4. A luggage carrier collapsible between an extended or in-use position and a retracted or storage position comprising a telescoping stand movable between a retracted position and an extended position, a base pivotally connected to said stand for movement between an extended position in which the base extends outwardly from the stand and a retracted position in which said base is aligned with said stand and means for releasably locking both said stand and said base in their extended



positions to permit use of said luggage carrier including means for simultaneously unlocking both said base and said stand to permit movement of said luggage carrier to its storage position.

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**4,591,184**

## WHEEL SUSPENSION FOR STEERABLE FRONT WHEELS OF MOTOR VEHICLES

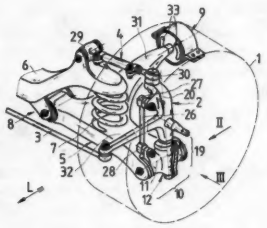
**Wolfgang Matschinsky, Munich, Fed. Rep. of Germany, assignor to Bayerische Motoren Werke AG, Munich, Fed. Rep. of Germany**

**Filed Aug. 30, 1984, Ser. No. 645,711**

**Claims priority, application Fed. Rep. of Germany, Aug. 30, 1983, 3331282**

**Int. Cl.[4] B60G *3/00***

**U.S. Cl. 280—666** **14 Claims**



1. A wheel suspension for steerable front wheels of motor vehicles, comprising wheel carrier means for supporting thereon a wheel, a tie-rod engaging at the wheel carrier means, an upper and a lower cross guide member, the upper and lower cross guide members being pivotally connected with the wheel carrier means and with a relatively fixed vehicle part, the lower cross guide member cooperating with a support spring being supported at the relatively fixed vehicle part by two pivot bearing means disposed one behind the other in the vehicle longitudinal direction and being constructed torsion-resistant, coupling means, said lower cross guide member being connected at the outer end thereof with said coupling means by way of a corner-rigid pivot bearing means having an essentially longitudinally extending pivot axis, the wheel carrier means being pivotally connected at said coupling means by way of an also corner-rigid pivot bearing means having an at least approximately vertical pivot axis, the last-mentioned

pivot bearing means being axially displaceable, and the wheel carrier means and coupling means being pivotally connected with an approximately vertical radius rod.

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**4,591,185**

## VEHICLE HEIGHT CONTROL SYSTEM

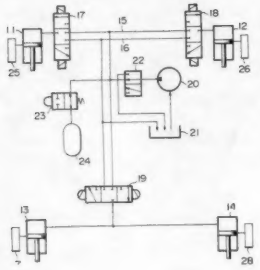
**Kazuyuki Natsume, Toyohashi, and Kaoru Oohashi, Okazaki, both of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan**

**Filed Oct. 26, 1984, Ser. No. 665,066**

**Claims priority, application Japan, Oct. 27, 1983, 58-202436**

**Int. Cl.[4] B60G *17/00***

**U.S. Cl. 280—707** **6 Claims**



**1.** A vehicle height control system comprising:

a plurality of vehicle height adjusters for performing adjusting operation in response to respective control signals;

position signal generator means for generating actual position signals each representing a vehicle height of a corresponding one of said vehicle height adjusters;

setting means for changing target adjustment positions of said vehicle height adjusters respectively; and

control means for generating the respective control signal for each of said vehicle height adjusters in accordance with a target difference between the target adjustment position and the actual position signal to adjust the vehicle height to achieve the target adjustment position,

said control means dividing said target difference for each vehicle height adjuster into a plurality of unit adjusting widths,

said control means, at a first stage, obtaining a pseudo-target adjustment position by a combination of the unit adjusting width and the actual position signal, and controlling each of said vehicle height adjusters to achieve the pseudo-target adjustment position,

said control means, upon completion of the first stage adjustment, at a second stage obtaining a next pseudo-target adjustment position from said unit adjusting width and the actual position signal at this time, and controlling each of said vehicle height adjusters to achieve the next pseudo-target adjustment position, and

said control means thereafter repeating the above control for vehicle height adjustment until said target adjustment positions for said vehicle height adjusters are achieved.

**4,591,186**

## HYDRAULIC SHOCK ABSORBING DEVICE OF ADJUSTABLE DAMPING FORCE TYPE

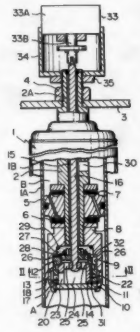
**Masahiro Ashiba, Kanagawa, Japan, assignor to Tokico Ltd., Kanagawa, Japan**

**Filed Oct. 16, 1984, Ser. No. 661,324**

**Claims priority, application Japan, Oct. 20, 1983, 58-162344[U]**

**Int. Cl.[4] B60G *11/26***

**U.S. Cl. 280—707** **4 Claims**



**1.** A hydraulic shock absorbing device of adjustable damping force type for use in a vehicle, said device comprising:

a hydraulic damper with the damping force thereof being adjustable between at least two, low and high damping force conditions;

selective switching circuit means operable by a driver of the vehicle for selectively determining the damping force of the damper;

at least one sensor means for detecting an operating condition of the vehicle; and

control means connected to said sensor means for adjusting the damping force of said damper to said high damping force condition, in response to a predetermined operating condition of the vehicle detected by said sensor means, and thereby to predominate over said switching circuit means.

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**4,591,187**

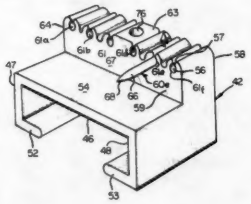
## BOOK RETAINING DEVICE AND METHOD OF USING SAME

**Richard L. Jeanson, Watertown, and John B. Olson, Waukesha, both of Wis., assignors to Fortec, Inc., Waukesha, Wis.**

**Filed Mar. 7, 1984, Ser. No. 587,222**

**Int. Cl.[4] B42F *7/04, 9/00;* B42D *17/00***

**U.S. Cl. 281—45** **13 Claims**



**1.** A retaining device for a book, such as a telephone directory, said device comprising:

an elongated support member having opposite end portions,

a pair of mounting members respectively carried on said opposite end portions of said support member,

at least one elongated, retainer member carried by each of said mounting members, each retainer member having a mounting portion engaged with its associated mounting member and an engaging portion extending inwardly toward the other of said mounting members, said engaging portions being adapted to extend into the opposite ends of a book to be retained by said device and between an adjacent pair of pages of said book in generally close proximity to the back thereof,

means for releasably securing said mounting members to said support member with the engaging portions of said retainer members extending into the opposite ends of said book, whereby said retaining member serves to releasably retain a book, such as a telephone directory, engaged with said holder so as to prevent unauthorized removal and/or theft of said book or telephone directory while permitting substantially unobstructed viewing of the pages thereof,

each of said mounting members has at least one recess therein from receiving and releasably retaining the mounting portion of a retainer member,

each of said mounting members has an upstanding boss portion, and said recesses are formed in said boss portion,

said recesses comprise a plurality of slots in said boss portion,

each of said boss portions has an upper surface and opposite end faces, each of said slots extends into the end faces of its associated boss portion and has a receiving portion sized to closely fit and frictionally retain the mounting portion of a retainer member, and at least said boss portions are of relatively rigid, yieldable material, whereby said retainer members are releasably retained in said boss portions by the interference fit of the mounting portions thereof in said receiving portions, said retainer members being insertable into and removable from said receiving portions by aligning the same with said receiving portions and applying sufficient force thereto to cause said retainer members to shift into said receiving portions.

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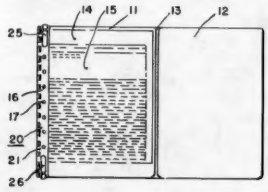
**4,591,188**

## ONE-WRITE PEGBOARD KEEPER PIN ASSEMBLY

**John C. Hensel, Perkasie, and Richard E. Penniman, Gwynedd Valley, both of Pa., assignors to Safeguard Business Systems, Inc., Fort Washington, Pa.**

**Filed Nov. 5, 1984, Ser. No. 668,572**
**Int. Cl.[4] B41L *3/06*; B42F *13/30, 3/00***
**U.S. Cl. 282—29 B** **1 Claim**




1. In a check writing journal comprising a panel having a topside with an edge margin and a series of alignment pegs protruding in spaced relation from the panel margin for engaging in similarly spaced holes in a record sheet and overlying checks to arrange each check in proper alignment with respect to spaces on the record sheet; and means for releasably clamping the checks and record sheet to the panel, including a clamping flange adapted to overlie the panel edge margin, hinge means pivotally connecting the clamping flange to the panel, a slide catch carried at each end of the clamping flange, and a keeper pin carried by the panel for releasably engaging the slide catch, the improvement wherein said keeper pin has a head disposed below the panel and a cylindrical shank projecting upwardly therefrom beyond the topside of the panel and terminating in a shaped tip, said shank having an annular recess located below said tip for releasably receiving said slide catch when said clamping flange is in clamping relation with said panel, said shank also having a shallow undercut portion in registry with said panel, said shank further having in its undercut portion a plurality of circumferentially spaced teeth providing a roughened peripheral surface, said panel having a topside portion surrounding said pin swaged into said undercut portion of said shank and into engagement with said teeth to fasten said pin permanently to said panel.

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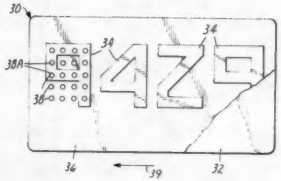
**4,591,189**

## DOCUMENT HAVING LIGHT-TRANSMISSIVE, ELECTRICALLY CONDUCTIVE AUTHENTICATING INTERIOR LAYER

**Reynold E. Holmen, White Bear Lake, and Edward J. Downing, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Dec. 27, 1983, Ser. No. 565,452**
**Int. Cl.[4] B42D *15/00*; B32B *7/14***
**U.S. Cl. 283—83** **14 Claims**




1. A standardized document including an authenticating interior layer which is light-transmissive and has an area of at least 1 $mm^2$, a thickness less than 20 nm, and an electrical resistivity less than 1000 ohms per square wherein the authenticating layer is sandwiched between antireflective thin film layers and, when the document is cut through the authenticating layer to expose a new edge, the authenticating layer at the edge is not visible to the naked eye.

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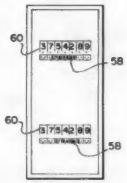
**4,591,190**

## VOUCHER WITH SELF-CONTAINED VERIFICATION MEANS

**Fred C. Clark, Mississauga, Canada, assignor to Canadian Security Printers Inc., Mississauga, Canada**

**Filed Sep. 9, 1983, Ser. No. 530,736**
**Int. Cl.[4] B42D *15/00***
**U.S. Cl. 283—102** **4 Claims**




1. A family of vouchers, each voucher comprising a substrate:

correlatable first and second identifying indicia located in separate locations on a surface of the substrate, the first indicia in a first of the locations being visible to the eye in the original condition of the voucher; the second indicia being located at a second of the locations;

a release coating layer at the upper surface of the second indicia; and

a readily removable outer coating layer overlying the release coating layer; wherein the materials of which the substrate, indicia and layers are made at least in the vicinity of the second location are selected and the surface conditions of the substrate and layers at least in the vicinity of the second location are selected such that

the adhesion between the release coating layer and the outer coating layer is relatively low,

the adhesion between the release coating layer and the substrate is relatively high,

the adhesion between the outer coating layer and the substrate is relatively high, and

the outer coating layer tends to disintegrate as a consequence of the step of removing same,

such that upon removal of the outer coating layer, the second indicia in the second location are visible to the eye, the second indicia being difficult to alter without detection by reason of the said selections;

each voucher in the family of vouchers having individual and unique identifying indicia,

and wherein the elements constituting the second indicia are in at least one dimension randomly spaced on the voucher within the area covered by the release coating and outer coating layers so that the exact location of the elements constituting the second indicia cannot be readily determined without removing the outer coating layer.

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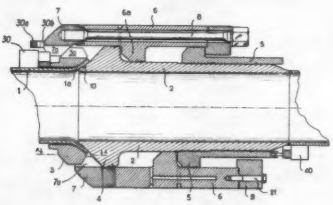
**4,591,191**

## MECHANICAL COUPLING DEVICE FOR IMMERSED PIPELINES

**Reué Fournié, Pau, and Francois Besnard, Lescar, both of France, assignors to Societe Nationale Elf Aquitaine (Production), Courbevoie, France**

**Filed Aug. 19, 1982, Ser. No. 409,635**
**Claims priority, application France, Sep. 3, 1981, 81 16740**
**Int. Cl.[4] F16L *23/00***
**U.S. Cl. 285—18** **6 Claims**



1. A mechanical coupling device for interconnecting two tubes, comprising in combination:

a tubular body connected at one end to the end of one tube,

said tubular body including an outwardly directed shoulder adjacent one end thereof and a seal face;

locking means carried by said tubular body adjacent to the other end thereof;

collar means on the end of the other tube and having a seal face and having a set of dogs;

a mobile assembly carried by said tubular body and having at one end a set of dogs to cooperate with the set of dogs on said collar means;

said mobile assembly having resilient deformable clamping maintenance means and having an internal inwardly directed shoulder received between said outwardly directed shoulder on said tubular body and said locking means to provide a jack chamber in which the internal shoulder acts as a piston;

said mobile assembly being movable relative to the collar to pass the sets of dogs between each other and to then align the sets of dogs axially;

means to pressurize the jack chamber to engage under pressure the aligned sets of dogs to deform the resilient clamping maintenance means and to sealingly engage said seal faces;

said locking means being adapted to lock the tubular body relative to the mobile assembly with said resilient maintenance means under deformation.

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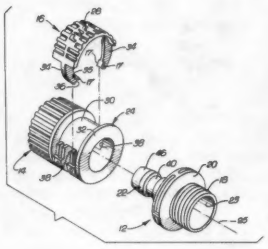
**4,591,192**

## QUICK CONNECT COUPLING

**Gary A. Van Exel, Fullerton; Victor Perez, Pomona, and Alfredo B. Marmol, West Covina, all of Calif., assignors to Rain Bird Consumer Products Mfg. Corp., Duarte, Calif.**

**Filed Mar. 15, 1984, Ser. No. 590,046**
**Int. Cl.[4] F16L *33/16***
**U.S. Cl. 285—83** **13 Claims**



1. A quick connect coupling for releasably connecting a pair of fluid flow conduits, comprising:

a male fitting for connection to one of the conduits and including a generally tubular male member having an external, generally circumferential groove formed therein;

a female fitting for connection to the other conduit and including a generally sleeve-shaped female member with an open outboard end for sliding reception of said male member, said female member defining a generally opposed pair of arcuate slots;

a generally C-shaped spring retainer having a generally opposed pair of locking arms including generally radially inner edges presented toward each other; and

a pair of lock tabs supported respectively on said arms generally at said inner edges thereof and projecting axially therefrom in a common direction, said arms and tabs supported thereon each having a combined axial width for reception through said female member arcuate slots;

said retainer being carried about said female member with said locking arms extending at least partially through said arcuate slots with said lock tabs projecting generally toward the outboard end of said female member, said locking arms being movable between locked and unlocked positions with said inner edges and said tabs resepectively projecting radially through said slots for reception into said male member groove to connect said fittings against axial separation and displaced radially outwardly from said male member groove to disconnect said fittings and permit axial separation thereof;

said female member including a pair of generally radially oriented cam surfaces, and said locking arms having cam follower surfaces movably engageable with said cam surfaces to displace said locking arms between said locked and unlocked positions, said retainer being carried about said female member with said cam follower surfaces in engagement with said cam surfaces and movable between first positions and second positions for displacing said cam follower surfaces along said cam surfaces to move said locking arms between said locked and unlocked positions;

said fittings being movable axially a short distance away

from each other in response to fluid pressure within the conduits when said fittings are connected to displace said lock tabs to positions axially offset from said arcuate slots and radially within said female member whereby said tabs are engageable with the inner diameter surface of said female member to prevent radially outward movement of said locking arms relative to said male member groove.

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## 4,591,193
## LINE PIPE OF SYNTHETIC MATERIAL ESPECIALLY FOR WASTE WATER

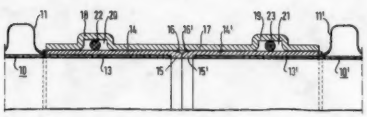
**Heinrich Oltmanns, Edewecht; Axel Granz, Oldenbury; Willi Dalhoff, Edewecht, and Rolf Othold, Oldenbury, all of Fed. Rep. of Germany, assignors to Oltmanns Ziegel und Kunststoffe GmbH, Edewecht, Fed. Rep. of Germany**

**Filed Dec. 7, 1983, Ser. No. 558,798**

**Claims priority, application Fed. Rep. of Germany, Dec. 11, 1982, 8234897[U]**

**Int. Cl.⁴ F16L *9/04***

**U.S. Cl. 285—138** **18 Claims**



1. A line pipe of synthetic material for nominal sizes above 200 mm such as a waste water pipe comprising a separate inner pipe and a transversely corrugated outer pipe having crests and troughs, the pipes being telescoped into one another in such a manner that the wave troughs of the outer pipe lie substantially against the outer surface of the inner pipe, and connection means at at least one of the ends of said line pipe for the connection of several line pipes to form a pipeline via a socket joint, characterized in that the inner pipe has a uniform external diameter cylindrical end portion projecting axially beyond one of the ends of said corrugated outer pipe and a cylindrical sleeve having an inner diameter complementary to the external diameter of and telescopically receiving said one of said end portions and fixed relative thereto.

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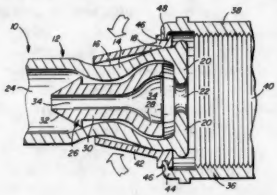
## 4,591,194
## FLUID CONDUIT ASSEMBLY

**George Tash, 18658 Chase St., Northridge, Calif. 91324**

**Filed Jul. 15, 1983, Ser. No. 514,289**

**Int. Cl.⁴ F16L *33/20***

**U.S. Cl. 285—249** **4 Claims**



1. An improved fluid conduit assembly, said assembly comprising, in combination:

(a) a flexible, resilient and readily deformable fluid conduit, having an open end,

(b) a substantially rigid conduit plug having a longitudinally extending fluid passageway therein, said plug having radially extending end portions at the front and rear ends thereof which define an annular channel therebetween,

(c) a conduit connector assembly, including:

(i) a connector member and

(ii) a readily deformable tubular sleeve attached to said connector member,

(d) wherein said plug is disposed inside said fluid conduit near its open end, and said fluid conduit with said plug therein is disposed within said tubular sleeve, whereby said sleeve is deformed and compressed into said annular channel of said plug to thereby hold and retain said conduit between said plug and said sleeve, wherein said fluid can pass freely through said conduit and plug,

(e) wherein said open end of said conduit bears a centrally directed flexible terminal rim which retains said plug in place in the absence of securement by said sleeve,

(f) wherein said conduit end in which said plug is disposed has a necked-down portion and an expanded portion, said necked-down portion being aligned with said annular channel.

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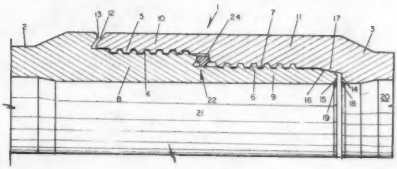
## 4,591,195
## PIPE JOINT

**K. Darrel Chelette, Katy, and Merle E. Evans, Spring, both of Tex., assignors to J. B. N. Morris, Harvey, La.**

**Filed Jul. 26, 1983, Ser. No. 517,415**

**Int. Cl.⁴ F16L *15/00***

**U.S. Cl. 285—332.3** **13 Claims**



1. A joint for coaxially interconnecting a pair of pipes, said joint comprising coaxial pin and box members respectively including interengaged external and internal first threads, and interengaged external and internal second threads, said first threads on said pin member being adjacent the free terminal forward end of said pin member and being of smaller outer diameter than said second threads, said threads holding the pipes against separation, said first threads and said second threads having substantially the same pitch and outline characteristics, said pin member being screwed about its axis longitudinally forwardly into said box member, metal-to-metal seating surfaces on said pin and box members, said surfaces in interengagement when undamaged, an annular pin member shoulder providing a stepped portion on said pin member between said first threads and said second threads, an annular box member shoulder providing a stepped portion on said box member between said first threads and said second threads, said threads having lands and roots, one of said shoulders being contiguous with a ring receiving means for receiving an annular ring, an annularly continuous ring of relatively rigid, internally tenacious plastic or rubber material received in said ring receiving means, said ring having radially outer and inner portions, an in situ sealing flange generating corner means located between said outer and inner portions for forming an in situ sealing flange on each side of said ring upon exposure to assembly pressure, said in situ sealing flange being pressure energizable by a pressure differential thereacross to provide sealing of said joint in a given direction even when the pressure differential in that direction exceeds the yield pressure of the said plastic or rubber material, one of said portions including stiffening means for supporting and stabilizing said ring in said ring receiving means upon make up of said joint, the axial width of said stiffening means being at least 40% of the axial width of the other portion, said other portion including face means for receiving pressure from said pin and box members upon make up of said joint and transmitting pressure to said corner means to cause said in situ sealing flange to form, said ring receiving

means being radially located at least about as far from the pipe axis as the pin first thread roots and including a pressure transmitting area for transmitting make up torque to said face means, and an undercut means for providing room for formation of said in situ sealing flange extending beyond said face means, a generally flat first chamfer joining said undercut to said pressure transmitting area and extending at an angle of about 15 to 75 degrees to the axis of said pipes, the shoulder other than the shoulder contiguous with said ring receiving means having a second chamfer for contacting and transmitting pressure to said face means, said second chamfer at an angle of about from 15 degrees to 75 degrees to the axis of said pipes, the take off points of said chamfers being at least substantially the same distance from the axis of said pipes and being no further from said axis than the radial mid-point of said other portion, the width of the first chamfer being at least equal to the width of said second chamfer, said undercut means having a concave radius of not less than 0.010 inches.

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**4,591,196**

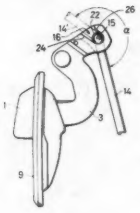
## OUTSIDE DOOR HANDLE ASSEMBLY

**Tokutaro Kurita, Kawasaki, Japan, assignor to Kokusan Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 335,367, Dec. 29, 1981, abandoned. This application Dec. 7, 1984, Ser. No. 679,100**

**Int. Cl.[4] E05B** *3/00*

**U.S. Cl. 292—336.3** **1 Claim**



1. A door handle assembly for operating a door latch mechanism by a door latch rod, one end of said door latch rod engaging the door latch mechanism and the other end of said door latch rod having an L-shape end engaging the door handle assembly, said door handle assembly comprising:

a door handle adapted to be pivotably mounted on a door,

an arm projection fixed at one end to said door handle and a free end of said arm projection defining two parallel arm elements,

an idle space defined between said two arm elements allows for a turning movement of said L-shape end of said door latch rod therethrough,

one of the two parallel arm elements defining a lateral circular opening for receiving said L-shape end of the door latch rod and the other of said two parallel arm elements defining an introduction recess including two opposed guide surfaces tapering inwardly towards a curved bottom section located at the base of said introduction recess, said curved bottom section is in alignment with and extends parallel to an outer edge of said lateral circular opening, one end of each of said guide surfaces being spaced from each other a distance greater than the diameter of said door latch rod, the other end of each of said guide surfaces terminating in said curved bottom section,

said lateral circular opening including a truncated conical portion tapering inwardly to a cylindrical opening from a side of said one arm element located adjacent to said idle space, one end of said truncated conical portion located at said side of said one arm element has a diameter greater than a diameter of said L-shape end of the door latch rod and the other end of said truncated conical portion terminates at said cylindrical opening having a diameter substantially equal to the diameter of said L-shape end of the door latch rod,

a center axis of the lateral circular opening extends transversely through the introduction recess, and

the door latch rod being guided through the introduction recess for aligning said L-shaped end of the door latch rod with the lateral circular opening while the L-shape end of the door latch rod is being pushed through said introduction recess into said lateral circular opening and said door latch rod is then rotated between said two parallel arm elements through an arc of rotation having an axis coincident with the center axis of the lateral circular opening.

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**4,591,197**

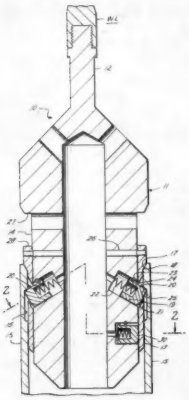
## WIRE LINE RUNNING AND/OR PULLING TOOL

**Neil H. Akkerman, Houston, Tex., assignor to AVA International Corp., Houston, Tex.**

**Continuation-in-part of Ser. No. 536,276, Sep. 27, 1983, abandoned. This application Feb. 11, 1985, Ser. No. 700,798**

**Int. Cl.[4] E21B** *31/10*

**U.S. Cl. 294—86.24** **12 Claims**

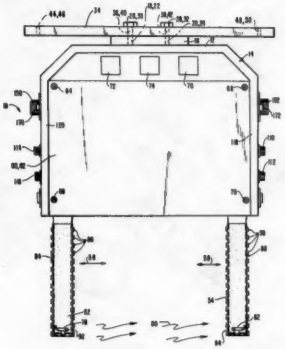


1. A wire line tool for running and/or pulling a well tool having a seat thereon and an annular groove about its inner diameter, comprising a body adapted to be raised and lowered on a wire line, latches carried by the body for sliding along guide surfaces on the body which extend downwardly and outwardly with respect to the axis of the body, means on the body cooperable with the seat of the well tool for locating the outer ends of the latches opposite the groove when the body is disposed within the well tool, and means yieldably urging the latches from inner positions in which their outer ends are adapted to move through the well tool into and out of positions opposite the groove, to outer positions in which their outer ends extend into the groove when opposite thereto, the upper sides of the latches having bearing surfaces which are engageable with the upper end of the groove, when the outer ends of the latches extend into the groove, to support the well tool from the wire line tool, and which are so related to bearing surfaces on the lower sides of the latches which are engageable with the guide surfaces on the body, when the well tool is so supported, as to prevent inward movement of the latches, and means responsive to vertical movement of the body with respect to the well tool for moving said latches inwardly to retract their outer ends from the groove and retain them in retracted positions, so that the wire line tool may be retrieved from the well tool.

## 4,591,198
## ROBOTIC END EFFECTORS

**Mathew L. Monforte, Hamilton, N.J., assignor to Monforte Robotics, Inc., Hamilton, N.J.**

**Filed Feb. 16, 1984, Ser. No. 580,715**
**Int. Cl.[4] B25J *15/08***
**U.S. Cl. 294—88** **14 Claims**



1. An end effector suitable for use on a robotic arm associated therewith, comprising, in combination:

(a) means for removably affixing said end effector to the distal end of said robotic arm;

(b) gripper means slideably retained within said end effector, said gripper means being adapted to be coupled to a power source and to cooperate with and removably retain a plurality of end effector tools and components upon receiving an electronic command signal, said gripper means includes a pair of finger members, each of said finger members having one end thereof affixed to a driving means operatively coupled to said power source for providing linear bi-directional displacement of said finger members, the other end of said finger members exending outwardly and adapted to engage and capture end effector tools and components therebetween, each of said finger members comprises;

(i) a hollow body portion having at least one through aperture disposed proximate the distal end thereof,

(ii) piston means disposed within said hollow body portion, said piston means having a movable rod member capable of movement proximate said body aperture sufficient to capture a member placed in said body aperture, and

(iii) means for activating said piston means to capture said member placed in said body aperture; and

(c) means for generating said electronic command signal, said electronic command signal being coupled to said gripper means for controlling the application of power from said power source.

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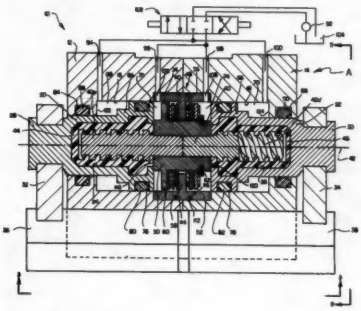
## 4,591,199
## DEVICE FOR GRIPPING WORKPIECES

**Theodore S. Zajac, Bay Village, Ohio, assignor to Zaytran Inc., Elyria, Ohio**

**Filed May 24, 1984, Ser. No. 613,576**
**Int. Cl.[4] B66C *1/44***
**U.S. Cl. 794—88** **16 Claims**

1. A device for moving members into engagement with a workpiece comprising two coaxial fluid cylinders, a piston movable in each of said fluid cylinders, means for directing fluid pressure to opposite sides of said pistons to effect movement of said pistons in said fluid cylinders away from each other and toward each other, means for insuring synchronous movement of said pistons comprising rod means extending along the axis of said coaxial fluid cylinders, said rod means and pistons having a driving interconnection which effects rotation of said rod means in one direction when said pistons move away from each other and in the reverse direction when



said pistons move toward each other, and a single bearing assembly between said fluid cylinders for supporting said rod means for rotation about said axis.

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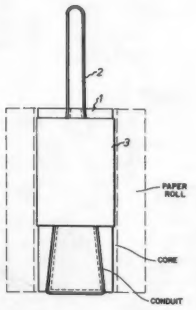
## 4,591,200
## LIFTING WEDGE

**Ilkka Randén, Rauma, Finland, assignor to Lassila & Tikanoja Oy, Turku, Finland**

**Filed Feb. 1, 1985, Ser. No. 698,503**
**Claims priority, application Finland, Jun. 2, 1984, 840466**
**Int. Cl.[4] B66C *1/54***
**U.S. Cl. 294—96** **8 Claims**




1. A lifting wedge for an elongate article having a tubular cylindrical core, the wedge comprising three separate wedge elements which fit together to form a cylinder, the elements comprising a central element and outer elements having adjacent interfitting planar longitudinal surfaces which converge from one end of the cylinder to the other end of the cylinder so that the central element has a larger end surface at said one end of the cylinder and a smaller end surface at the other end of the cylinder while the outer elements have smaller end surfaces at said one end of the cylinder and larger end surfaces at the other end of the cylinder, an endless lifting belt entrained longitudinally around the central element, the belt having a lifting loop extending from the other end of the cylinder, and means defining a friction-increasing peripheral outer surface for the cylinder.

4,591,201

## DEVICE FOR CARRYING WOOD AND THE LIKE

Michael J. Antonelli, 14417 Aiken Rd., Louisville, Ky. 40223

Filed Dec. 3, 1984, Ser. No. 677,578
Int. Cl.[4] A45F 3/00
U.S. Cl. 294—137 14 Claims

1. A device for carrying pieces of firewood and the like, comprising:
- an arcuate body adapted to receive wood to be carried on its concave surface;
- a single hand grasp located at one of the longitudinal sides of the arcuate body and integral with said arcuate body adapted to be grasped by a human hand; and,
- a pair of parallel, spaced apart integral ribs located on the convex surface of the arcuate body for locating a human arm on the convex surface of the arcuate body.

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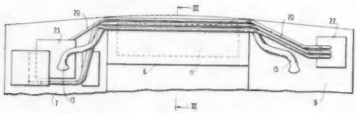
4,591,202

## FRONT ASSEMBLY FOR MOTOR VEHICLES

Gerhard Burk, Sindelfingen, and Manfred Mordau, Wildberg, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 11, 1985, Ser. No. 690,537
Claims priority, application Fed. Rep. of Germany, Jan. 27, 1984, 3402744
Int. Cl.[4] B62D 25/08
U.S. Cl. 296—194 4 Claims



1. A front assembly for motor vehicles, having a cross-member extending underneath a windshield and with an end wall which adjoins the cross-member at the bottom and in front of which is located, on the same side as an engine space, an equipment space which is divided into a central space and lateral spaces adjacent to the central space, each on the right and left respectively, the equipment space being partitioned off from the engine space, the end wall possessing, in the region of the central space, a passage orifice for air conveyed by a blower of a heating and/or air-conditioning system of the vehicle, and comprising

channel means comprising
- a first partition wall disposed in the upper part of the central space contiguous to said engine space,
- a second partition wall disposed behind said first partition wall in the longitudinal direction of the vehicle to define a channel enclosed by said first and second partition walls for receiving communication lines, the channel having an opening at the top and

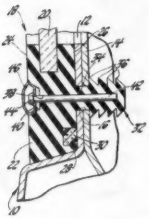
engine hood means for sealing said opening.

4,591,203

## MODULAR WINDOW ASSEMBLY

Herbert Furman, Southfield, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 2, 1984, Ser. No. 596,038
Int. Cl.[4] B60J 1/00; F16B 13/04
U.S. Cl. 296—201 2 Claims



1. A modular window assembly and combined fastening system for closing a window opening in a body, said body having a rigid peripheral flange integral with said body and defining said window opening, said peripheral flange having at least one flange opening therethrough that has a fixed dimension, said window assembly comprising in combination:
- a window panel,
- a molded frame of resilient plastic material substantially surrounding the peripheral edge of the window panel and having an outer surface accessible from outside the vehicle, and an undersurface engageable with at least a portion of the peripheral flange near the flange opening,
- said molded frame further including at least one substantially resilient stud molded integrally with its undersurface and having, in its original shape, an elongate configuration with a dimension slightly greater than the fixed dimension of the flange opening, said molded frame further including a passage therein passing from the outer surface substantially, but not completely, through the length of the molded stud to a closed end,
- and a push pin insertable into the passage and movable therewithin against said closed end, said pin having a head spaced from said molded frame outer surface by a predetermined amount,
- whereby the assembly may be positioned adjacent the window opening with the stud aligned with the flange opening and the stud elongated by pushing the pin head from outside the vehicle, said pin head then cooperating with said molded frame by contacting said molded frame outer surface after moving said predetermined amount, said predetermined amount being sufficient to further elongate the stud so as to decrease its stud dimension with respect to the fixed dimension of the flange opening so that the stud may pass through the flange opening until the frame undersurface engages the flange, the stud returning substantially to its original shape when it is not being elongated to grip the flange at the flange opening and thereby cooperate with the flange opening to hold the molded frame to the vehicle body.

## 4,591,204
## STRUCTURE FOR AN AUTOMOTIVE VEHICLE BODY

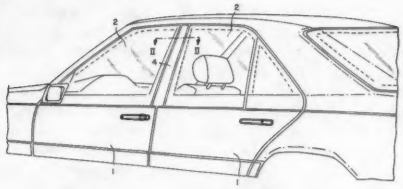
**Joseph Gallitzendoerfer, Sindelfingen; Peter Pfeiffer, Boeblingen; Johann Tomforde, Sindelfingen, and Ferdinand Heilhake, Stuttgart, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Apr. 16, 1984, Ser. No. 600,816**

**Claims priority, application Fed. Rep. of Germany, Apr. 15, 1983, 3313658**

**Int. Cl.**[4] **B60J** *5/00*

**U.S. Cl. 296—202** **6 Claims**



1. Structure of an automotive vehicle body, comprising:

body means;

first window means supported on said body means;

second window means supported on said body means such that an outer surface of an edge portion of said second window means is aligned with, but separated by a space from, an outer surface of an edge portion of said first window means;

a column supported on said body means adjacent to said space separating said first and second window means; and

a cover disposed in said space and attached to said column such that an outer surface of said cover is aligned with said outer surfaces of said edge portions of said first and second window means, said cover attached to said column being spaced apart from said column and said spacing being adjustable.

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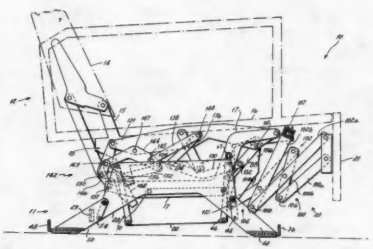
## 4,591,205
## GLIDER RECLINER

**Ronald O. James, Shelbyville, Ky., assignor to Leggett & Platt, Incorporated, Carthage, Mo.**

**Filed Nov. 4, 1983, Ser. No. 548,706**

**Int. Cl.**[4] **A47C** *1/038;* **A47D** *13/10*

**U.S. Cl. 297—85** **12 Claims**



1. A glider recliner comprising:

a body support including a back rest and a seat;

opposed recliner seat links adapted to support said body support;

a leg rest assembly pivotally connected to said recliner seat links, said leg rest assembly including leg rest linkage means operable to move a leg rest between a retracted position and an extended position;

recliner linkage means connected to each of said recliner seat links for moving said body support from an upright to a reclined position, a recliner base plate connected to said recliner linkage means, said recliner linkage means being operable to lower the rear of said seat and move it closer to said recliner base plate than the front of said seat while simultaneously effecting extension of said leg rest from retracted to extended position, said recliner linkage means including a series of pivotally interconnected links operable to move said body support between an upright position and a reclined position;

a glider base including a base assembly and a glider linkage assembly pivotally suspended from each side of said base assembly, said glider linkage assembly being movable forwardly and rearwardly relative to said base assembly along a gliding path; and

each of said recliner base plates being connected to one of said glider linkage assemblies for movement therewith along said gliding path.

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## 4,591,206
## TABLE ATTACHMENT FOR CHAIRS

**Elvern G. Pribble, 2327 E. Pleasant St., Davenport, Iowa 52803**

**Filed Sep. 4, 1984, Ser. No. 646,732**

**Int. Cl.**[4] **A47B** *83/02*

**U.S. Cl. 297—148** **2 Claims**

1. A table attachment for a chair having a right and left arm rests, comprising right and left supports adapted to lie respectively along the right and left arm rests and being fore-and-aft elongated so as to project respectively ahead of the arm rests, each support having front and rear ends and each rear end portion including upright pivot means for the removable and laterally swingable attachment thereof to the respective arm rest, a table member dimensioned to span the mounted supports and being of rigid end-to-end construction to provide right and left end portions respectively overlaying and resting on the right and left front end portions of the supports, and right and left means respectively cooperative between the right and left end portions of the table member and the front end portions of the supports for mounting the table member on the supports, and each of said means including, for each support, front and rear similar round holes on vertical axes spaced apart lengthwise of the associated support and, for the table member, right and left round pegs depending respectively from the undersides of the right and left end portions of the member and dimensioned to snugly but turnably fit any of the holes, and a third round peg depending from the underside of the member at an intermediate portion thereof and also dimensioned to snugly but turnably fit any of the holes, wherein the distance between the first and third pegs and the second and third pegs is the same and is equal to the spacing between the front and rear holes in either support, whereby the table member may be supported on only one support by locating the intermediate peg in the forward hole of the support and one of the right or left pegs in the rear hole of the support.

**4,591,207**

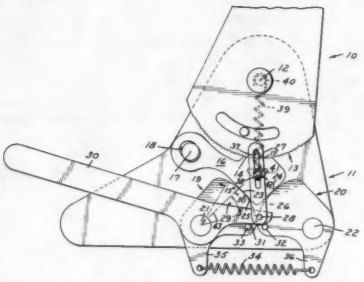
## CONTINUOUSLY VARIABLE ADJUSTABLE HINGE

**Egon Nithammer, Plainwell; Karl H. Ligensa, Battle Creek, and Fred C. Kresky, Richland, all of Mich., assignors to Keiper Recaro Inc., Battle Creek, Mich.**

**Continuation-in-part of Ser. No. 595,591, Apr. 2, 1984, abandoned. This application Apr. 4, 1985, Ser. No. 719,864**

**Int. Cl.[4] A47C *1/026***

**U.S. Cl. 297—366** **39 Claims**



**26**. Adjustable seat back hinge comprising pivotally connected seat and seat back brackets, a toothed sector on one of said brackets, a toothed pawl for retaining said toothed sector in adjusted relation to the other of said brackets, and means for releasably positioning said pawl in fixed adjusted engagement with said sector, characterized by means for mounting said pawl with sufficient freedom to accommodate at least one tooth shift in position relative to said sector, angularly related surfaces on said pawl, a pair of cams separately pivotally mounted on said other bracket with individually positionable dual cam surfaces individually engageable with said angularly related surfaces for resisting displacement of said pawl from any position of initial engagement with said sector at any infinitely adjustable relative angle of said brackets, means for sequentially moving said pawl into initial engagement with said sector at any given adjusted relative position of said brackets and then moving said cams into retaining engagement with said pawl.

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**4,591,208**

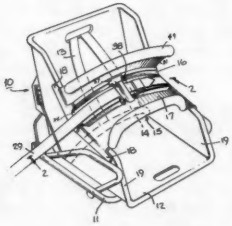
## SAFETY SHIELD FOR USE IN A VEHICLE

**Quentin H. McDonald, Scarsdale, N.Y.; Richard L. Panicci, Hanover, and Ralph M. Nowak, Wilbraham, both of Mass., assignors to Bobby-Mac Company, Inc., Scarsdale, N.Y.**

**Continuation of Ser. No. 344,050, Mar. 22, 1973, abandoned. This application Dec. 6, 1979, Ser. No. 100,958**

**Int. Cl.[4] B60N *1/12***

**U.S. Cl. 297—487** **9 Claims**



**7**. A safety shield for use in a vehicle comprising a one-piece energy-absorbing body of non-rigid energy-absorbing material adapted to yield under the impact of an occupant to absorb the energy of the impact to some degree before precluding further forward motion of the occupant; said body including means on each lateral side thereof for engaging a seat, a central portion extending in an arch-like manner between said means for disposition across an engaged seat, said central portion having a rounded convexly curved transverse cross-sectional shape and being of a continuous curvilinear cross-section with a decreasing thickness from the center line thereof towards each said lateral side.

**8**. A safety shield for use in a vehicle comprising a one-piece energy-absorbing body of non-rigid energy-absorbing material adapted to yield under the impact of an occupant to absorb the energy of the impact to some degree before precluding further forward motion of the occupant; said body including means on each lateral side thereof for engaging a seat, a central portion extending in an arch-like manner between said means for disposition across an engaged seat, said central portion having a rounded convexly curved transverse cross-sectional shape, a face guard portion extending outwardly from and over an upper edge of said central portion, and a gripping means secured to said body within said central portion for receiving and gripping a retaining belt.

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**4,591,209**

## PROTECTING DEVICE FOR PARTIAL-CUT CUTTING MACHINES

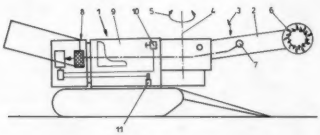
**Bernhard Dröscher; Otto Schetina; Herwig Wrulich, and Alfred Zitz, all of Zeltweg, Austria, assignors to Voest-Alpine Aktiengesellschaft, Vienna, Austria**

**Filed Dec. 28, 1983, Ser. No. 566,416**

**Claims priority, application Austria, Dec. 31, 1982, 4742/82**

**Int. Cl.[4] E21C *27/20***

**U.S. Cl. 299—1** **9 Claims**



**1**. A device for protecting a partial-cut cutting machine from overload, said machine comprising a pivotable cutting arm carrying a rotatably supported cutting head and a hydraulic drive including a hydraulic pump of variable capacity for pivoting said arm, said device comprising a vibration sensor carried by said arm for detecting vibration of said arm, said vibration sensor producing signals of which are coupled via an electronic control system with the pivotal drive of the cutting arm.

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**4,591,210**

## WHEEL BALANCING WHEEL COVER

**Leo G. Nickoladze, 1155 Kahili St., Kailua, Hi. 96734**

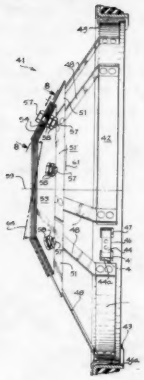
**Continuation-in-part of Ser. No. 213,953, Dec. 8, 1980, abandoned. This application Aug. 12, 1983, Ser. No. 522,812**

**Int. Cl.[4] B60B *7/04, 13/00***

**U.S. Cl. 301—5 BA** **9 Claims**

**1**. Apparatus for balancing a wheel as the wheel rolls along a surface comprising a plurality of weights, conical mounting means for carrying said weights about the axis of said wheel to move independently of each other, said conical mounting means supporting some of said weights to be urged in response to rotation of an unbalanced wheel to move toward the plane of the wheel and toward the axis of rotation of the wheel and

supporting other weights to be urged radially and axially away from the wheel so as to move said weights between a first set



of positions and a second set of positions, said second set of positions serving to balance the wheel.

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**4,591,211**

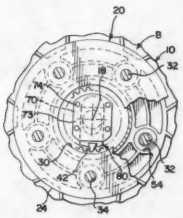
## LOCKABLE CENTRAL NUT FOR VEHICLE WHEEL MOUNTING

**James R. Browning, Berea, and Louis D. Carlo, Cleveland, both of Ohio, assignors to Mr. Gasket Company, Cleveland, Ohio**

**Filed Oct. 12, 1984, Ser. No. 660,403**

**Int. Cl.[4] B60B *3/16***

**U.S. Cl. 301—9 G** **21 Claims**



**1**. A wheel mounting for connecting a wheel having a central opening to a rotatable axle support of a motor vehicle comprising:

an adapter adapted to be fixedly mounted on the axle support, said adapter having an annular hub having inner and outer cylindrical surfaces, said outer cylindrical surface being slidably received through the central opening in the wheel; a threaded portion on the outer cylindrical surface of said hub adjacent the outer end thereof;

nut means having an outer peripheral torque transmitting surface and a rearwardly opening cavity defined by a base wall and cylindrical wall; a threaded portion on the cylindrical wall threadably engagable with said threaded portion of said hub of said adapter;

ratchet means formed on said inner cylindrical surface of said hub adjacent the outer end thereof;

pawl means slidably supported on said base wall of said nut means for radial movement between a first position in engagement with said ratchet means and a second position out of engagement with said ratchet means;

locking means operatively associated with said pawl means movable between a locked position in engagement with said pawl means in said first position for locking said pawl means thereat to thereby prevent relative rotation between said nut means and said hub, and, an unlocked position out of engagement with said pawl means; and,

release means carried by said base wall operatively associated with said locking means and accessible through said base wall from exterior of said nut means for moving said locking means from said locked position to said unlocked position to thereby permit movement of said pawl means to said second position and relative rotation between said nut means and said hub.

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**4,591,212**

## WHEEL BEARING ASSEMBLY

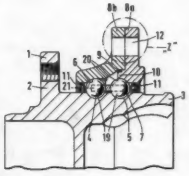
**Jochen Balken, Neunkirchen-S.; Werner Krude, Siegburg, both of Fed. Rep. of Germany, and Michel A. Orain, Conflans-Sainte-Honorine, France, assignors to Uni-Cardan Aktiengesellschaft, Siegburg, Fed. Rep. of Germany**

**Filed Oct. 24, 1983, Ser. No. 544,595**

**Claims priority, application Fed. Rep. of Germany, Oct. 22, 1982, 3239058**

**Int. Cl.[4] B60B *27/02***

**U.S. Cl. 301—105 R** **4 Claims**

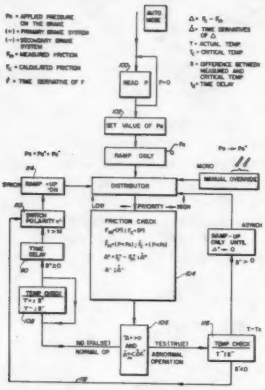


**1**. A bearing assembly for a wheel driven through a universal joint particularly for a motor vehicle wherein wheel hub means of said wheel are arranged in driven engagement with a part of said universal joint comprising: inner race means formed by at least one of said wheel hub means and said part of said universal joint; outer race means adapted to be connected with wheel carrier means of said motor vehicle; first and second inner bearing tracks formed in said inner race means; first and second outer bearing tracks formed in said outer race means; a first plurality of rolling elements disposed in operative load-bearing engagement between said first inner and outer bearing tracks; a second plurality of rolling elements disposed in operative load-bearing engagement between said inner and outer bearing tracks; said outer race means being formed in two separate parts, one of said parts having said first outer bearing tracks formed therein and the other of said parts having said second outer bearing tracks formed therein; said first and second outer bearing tracks being formed respectively free of undercuts in the axial direction of said assembly so as to allow a filling of said first inner and outer bearing tracks and said second inner and outer bearing tracks with said first and said second plurality of rolling elements respectively; and alignment and securing means for aligning said two parts of said outer race means in operative position relative to each other and for securing said two parts of said outer race means in aligned position; said securing means being formed as clamping elements clamping said two separate parts of said outer race means together to hold them in relative alignment with each other both radially and axially while simultaneously applying a preload to said bearing assembly, said alignment means comprising an axially directed centering extension formed on one of said two separate parts of said outer race means and a receiving bore formed on the other of said two separate parts engaging said centering extension to align said two separate parts together.

## 4,591,213
## BRAKING SYSTEM

**Uri Rapoport, Oak Park, Ill., assignor to LandAire DynaBrake, Inc., Chicago, Ill.**

**Filed Apr. 21, 1983, Ser. No. 487,320**
**Int. Cl.[4] B60T *8/00***
**U.S. Cl. 303—93** **13 Claims**



2. A braking system for cooperation in safely reducing the speed and stopping movement of a vehicle by minimizing brake failure, said vehicle having weight supporting wheel assemblies and a plurality of said assemblies having brakes associated therewith, said system including primary and secondary brake sections associated with wheel assemblies having brakes associated therewith, means for sensing frictional froces associated with each brake section, control means for receiving the sensed frictional forces and for activating the primary and secondary sections, said control means including means for comparing the measured frictional forces with a predetermined value and activating said sections in response to the comparison, whereby the primary section is initially engaged for braking and, in the event the measured frictional forces are less than the predetermined frictional force engaging the secondary brake section.

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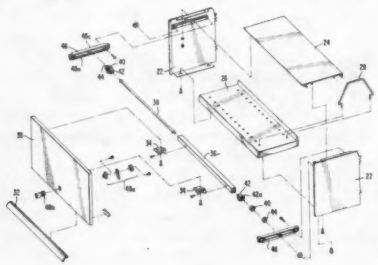
## 4,591,214
## CABINET CLOSURE ASSEMBLY

**Robert E. Reuter, Gravel Pike Palm, Pa., and Isidoro N. Markus, Rego Park, N.Y., assignors to Knoll International, Inc., New York, N.Y.**

**Filed Mar. 1, 1985, Ser. No. 707,465**
**Int. Cl.[4] E05D *15/58***
**U.S. Cl. 312—110** **6 Claims**



1. In a cabinet of the type having an opening, a panel pivotable between blocking and unblocking positions in which said opening is respectively blocked and unblocked by said panel, said panel being slidable into said cabinet from said unblocking position along parallel spaced tracks, each track including a gear rack, and spur gears mounted on said racks, and an equalizer rod joining together said spur gears and coupled to said panel for ensuring free movement of said panel along said tracks, the improvement comprising a tubing enclosing said equalizer rod and mounted for movement therewith and including means at the ends of said tubing coupled to said tracks for preventing pivoting of said tubing, and hinge means mounted to said tubing for supporting said panel for said pivotable movement thereof.

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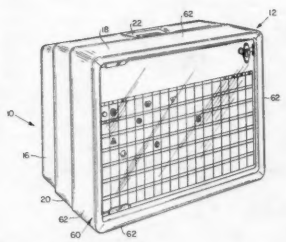
## 4,591,215
## MERCHANDISING AND DISPLAY DEVICE

**Howard Robbins, 1925 N. Clybourn, Chicago, Ill. 60614**

**Filed Sep. 17, 1984, Ser. No. 651,596**
**Int. Cl.[4] A47B *81/00***
**U.S. Cl. 312—234.3** **3 Claims**

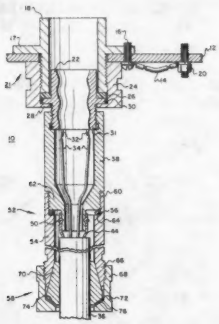


1. In combination with a portable cabinet having top, bottom and side walls defining an enclosed compartment closed at one end of said walls by a front wall and open at its opposite end with a plurality of trays slideable into said compartment from said opposite end and a removable cover closing said opposite end to enclose said trays in said compartment, the improvement of a display attachment attached to said cabinet and including a front defining a display surface and having frame-type connecting means secured to said cabinet with said display surface being divided into a plurality of individual segments, each individual segment having individual identifying indicia thereon, a transparent cover releasably secured to said front and covering said display surface for enclosing discrete articles on respective segments of said display surface while accommodating visual inspection thereof, said connecting means having brackets secured thereto defining slots for receiving edges of said transparent cover and a lock on said transparent cover for locking said transparent cover to said display attachment, and a plurality of corresponding indicia equal in number and identification to said individual identifying indicia and attached to exposed surface of said trays at said opposite end of said cabinet so that a supply of discrete articles for each of said discrete articles displayed on said display surface can be stored in said trays in corrolated relation using said indicia and individual discrete articles can readily be located in said trays upon request by a consumer viewing the display surface.

## 4,591,216
## GROUNDING SHIELDED CABLE CONNECTOR ASSEMBLY

Glen E. McClune, So. Milwaukee, Wis., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Jul. 17, 1984, Ser. No. 631,657
Int. Cl.[4] H01R *17/04*
U.S. Cl. 339—14 R 7 Claims



1. A grounding shielded cable connector assembly comprising:

a cabinet connector adapted to be supported by a cabinet for establishing a highly conductive path to ground, said cabinet connector being threaded at a distal end;

a cable coupling having threads at one end engageable with the threads of said cabinet connector for securing said cable coupling to said cabinet connector to establish a highly conductive butting junction between them, said cable coupling having a fixed electrically conductive generally cylindrical portion projecting from its end furthest from the butting junction for receiving a shield of a shielded cable in sleeved relationship over said cylindrical portion without adversely affecting said shield;

an annular shield fastener for releasably securing said shield to said cylindrical portion to form a mechanical junction between said shield and said cable coupling which provides a highly conductive electrical junction between said shield and said cable coupling;

a hollow plug slidable over said cable and threadedly engageable with said cable coupling at one end of said plug to fasten said plug to said cable coupling and enclose said cylindrical portion, said plug being adapted at its other end to receive a sealing fastener; and

a sealing fastener adapted to secure said cable to said plug in a sealing fashion upon assembly of said plug to said cable coupling.

## 4,591,217
## LOW INSERTION FORCE CONNECTION ARRANGEMENT

William A. Reimer, Wheaton, Ill., assignor to GTE Communication Systems Corporation, Northlake, Ill.

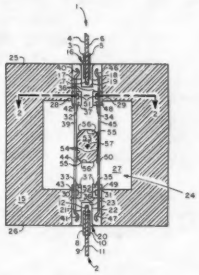
Continuation-in-part of Ser. No. 527,638, Aug. 29, 1983, Pat. No. 4,505,527. This application Dec. 10, 1984, Ser. No. 680,218
The portion of the term of this patent subsequent to Mar. 12, 2002, has been disclaimed.
Int. Cl.[4] H01R *9/09*
U.S. Cl. 339—17 LM 7 Claims

1. In combination, a first printed wiring board and a second printed wiring board, each printed wiring board including a plurality of terminals, and a low insertion force arrangement for establishing a connection between said first and second printed wiring boards, said arrangement comprising:

a plurality of connection springs, each spring including first and second contacts, first and second pivot points and an actuator engaging area, each of said contacts engageably positioned relative to a corresponding one of said terminals;

first and second fulcrums positioned to engage each of said springs at said first and second pivot points;

an actuator located proximate to each of said springs at said actuator engaging area, said actuator being positioned in a first actuator position relative to each of said springs to pivot each of said springs about said fulcrums, at said pivot points, to a first spring position and thereby cause said contacts to engage with said respective terminals and



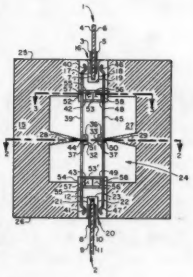
said actuator further being positioned in a second actuator position relative to each of said springs to pivot each of said springs about said fulcrums at said pivot points, to a second spring position and thereby cause contacts to disengage from said respective terminals;

a connector body including plurality of spring receiving cavities and at least two printed wiring board receiving cavities; said connection springs each being positioned within a respective one of said spring receiving cavities, said printed wiring boards being positioned within a respective one of said printed wiring board receiving cavities, and said printed wiring board receiving cavities being positioned at an angle to each other.

## 4,591,218
## LOW INSERTION FORCE CONNECTION ARRANGEMENT

William A. Reimer, Wheaton, Ill., assignor to GTE Communication Systems Corporation, Northlake, Ill.

Continuation-in-part of Ser. No. 527,639, Aug. 29, 1983, Pat. No. 4,505,528. This application Dec. 10, 1984, Ser. No. 679,793
The portion of the term of this patent subsequent to Mar. 12, 2002, has been disclaimed.
Int. Cl.[4] H01R *9/09*
U.S. Cl. 339—17 LM 9 Claims



1. In combination, a first printed wiring board and second printed wiring board, each printed wiring board including a plurality of terminals, and low insertion force arrangement for establishing a connection between said printed wiring boards, said arrangement comprising:

a plurality of connection springs each including a first and a second contact, a pivot point, and a first and a second actuator engaging area, said first and second contacts each

engageably positioned relative to a corresponding one of said terminals of a respective one of said printed wiring boards;

a plurality of fulcrums each positioned to engage a respective one of said pivot points;

a first and a second actuator located proximate to at least a first and a second one of said springs at said first and said second actuator engaging areas respectively, said first and said second actuators each operated to first position relative to said springs to pivot said springs about said respective pivot points and engage a respective one of said contacts with said terminals of a respective one of said printed wiring boards, said first and said second actuators further operated to a second position relative to said first and said second ones of said springs to pivot said springs about said pivot points and disengage said respective contacts from said terminals of said respective printed wiring boards; and

a connector body including a plurality of spring receiving cavities and at least two printed wiring board receiving cavities, said connection springs each positioned within a respective one of said spring receiving cavities, said printed wiring boards positioned within a respective one of said printed wiring board receiving cavities, and said printed wiring board receiving cavities positioned at an angle to each other.

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**4,591,219**

## LOW INSERTION FORCE CONNECTION ARRANGEMENT

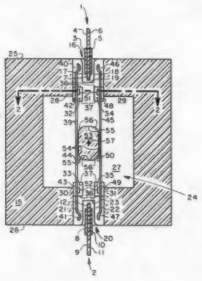
**William A. Reimer, Wheaton, Ill., assignor to GTE Communication Systems Corporation, Northlake, Ill.**

**Continuation-in-part of Ser. No. 527,638, Aug. 29, 1983, Pat. No. 4,505,527. This application Dec. 10, 1984, Ser. No. 679,795**

**The portion of the term of this patent subsequent to Mar. 12, 2002, has been disclaimed.**

**Int. Cl.[4] H01R *9/09***

**U.S. Cl. 339—17 LM** **5 Claims**



1. In combination, a first printed wiring board and a second printed wiring board, each printed wiring board including at least one terminal, and a low insertion force arrangement for establishing a connection between said printed wiring boards, said arrangement comprising:

at least one connection spring, said spring including first and second contacts, first and second pivot points and an actuator engaging area, each of said contacts engageably positioned relative to a corresponding one of said terminals;

first and second fulcrums positioned to engage said spring at said first and said second pivot points; and

an actuator including at least one sloping ramp positioned proximate to said actuator engaging area, said ramp engaging said engaging area when said actuator is linearly positioned to a first actuator position relative to said spring to pivot said spring about said fulcrums at said pivot points, to a first spring position and thereby causing said contacts to engage with said respective terminals, and said ramp disengaging said engaging area when said actuator is linearly positioned to a second actuator position relative to said spring to pivot said spring to a second spring position and thereby causing said contacts to disengage from said respective terminals.

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**4,591,220**

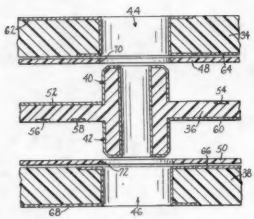
## INJECTION MOLDED MULTI-LAYER CIRCUIT BOARD AND METHOD OF MAKING SAME

**John Impey, Apt. 3E, Cortland Bldg., 640 Mix Ave., Hamden, Conn. 06514, assignor to Rollin Mettler; John Mettler and John Impey, all of North Haven, Conn.**

**Continuation-in-part of Ser. No. 660,495, Oct. 12, 1984, abandoned. This application Aug. 28, 1985, Ser. No. 771,134**

**Int. Cl.[4] H05K *1/14***

**U.S. Cl. 339—17 M** **21 Claims**



1. A method of forming a multi-layer circuit board comprising the steps of:

providing a first enclosed injection mold adapted to form a first circuit board substrate having interconnecting pins projecting out of the surface of the first substrate;

providing a second enclosed injection mold adapted to form a second circuit board substrate shaped to mate with the first substrate and having interconnecting holes in the second substrate to receive the interconnecting pins on the first substrate;

fabricating the first and second circuit board substrates by injecting an electrically nonconductive substrate material into the first and second injection molds;

removing the first and second substrates from the injection molds;

applying an electrically conductive material onto defined portions of the surface of the first and second substrates to form circuit leads, onto the exterior of the interconnecting pins on the first substrate and into the interior of the interconnecting holes in the second substrate;

providing an electrically nonconductive adhesive material; and

assembling the multi-layer circuit board by placing the adhesive material between the first and second substrates and mating the interconnecting pins and holes, the electrically nonconductive adhesive material being positioned to insulate the circuit leads on the facing surfaces of the substrates and permitting electrical connection between selected circuit leads at the point of contact between the exterior of the interconnecting pins and the interior of the interconnecting holes.

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**4,591,221**

## ELECTRICALLY CONDUCTIVE DEVICE

**Lucien C. De Brouckere, Stekene; Ludo M. J. Caers, Edegem, and Karel H. Verbert, Kalmthout, all of Belgium, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed Dec. 16, 1983, Ser. No. 562,316**

**Claims priority, application Belgium, Dec. 22, 1982, 59973**

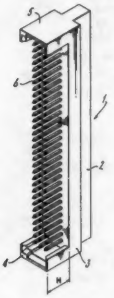
**Int. Cl.[4] H01R *31/08, 13/53***

**U.S. Cl. 339—19** **8 Claims**

1. An electrically conductive device for electrically interconnecting contacts of a conventional first electrical connector to prevent electrostatic charges from damaging the related

circuitry when the conventional first connector is not in use, comprising:

a second connector having a bottom portion containing a plurality of separate male type contacts adapted to cooperate with corresponding female type contacts of the conventional first electrical connector;



said bottom portion of said second connector being formed from an electrically conductive plastic material to electrically interconnect said separate male type contacts within the device whereby said separate male type contacts are electrically interconnected only by the electrically conductive plastic material.

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**4,591,222**

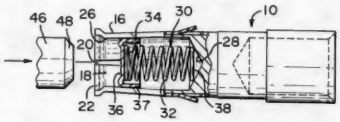
## LIMITED INSERTION FORCE CONTACT TERMINALS AND CONNECTORS

**Howard R. Shaffer, Millersburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Aug. 31, 1984, Ser. No. 646,554**

**Int. Cl.[4] H01R *13/62***

**U.S. Cl. 339—74 R** **69 Claims**



1. A passive cam follower means associated with a first electrical article where said first article has at least one spring contact arm extending forward from a body portion of said article and a cooperating surface means spaced laterally therefrom and associated with said at least one spring contact arm, where said at least one spring contact arm has a contact surface for electrical engagement with associated contact surface means of a second electrical article in an axial mating procedure requiring insertion force, wherein:

said passive cam follower means comprises a bracing means, a stop means and a compression means between said bracing means and said stop means;

said compression means has a low compression strength;

said stop means is disposed in stopping engagement with a cooperating stop means of said first article;

said compression means is disposed along the mating axis and is compressible by said second article during said axial mating;

said bracing means is disposed in a position adjacent to and in bracing engagement with said at least one spring contact arm proximate said contact surface thereof and said cooperating surface means to hold said spring contact arm substantially in a preselected spring-biased position in relationship to said cooperating surface means when said first article is not in mated engagement with said second article, said position being substantially equivalent to the position of said at least one spring contact arm when said first article and said second article are fully mated, whereby said mating requires substantially less insertion force.

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**4,591,223**

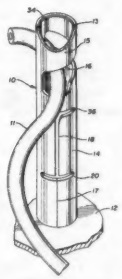
## ELECTRICAL CONNECTOR

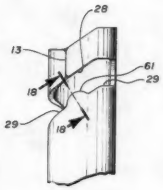
**Vasantrai A. Vachhani, Eden Prairie, Minn., assignor to Magnetic Controls Co., Minneapolis, Minn.**

**Filed Sep. 18, 1984, Ser. No. 651,871**

**Int. Cl.[4] H01R *4/24***

**U.S. Cl. 339—97 R** **5 Claims**





1. An electrical connector for terminating or connecting an electrical wire comprising:

an elongated tubular sleeve section having a side wall and a longitudinal axis;

an elongated wire receiving slot defined by a pair of opposing wire gripping edges in said side wall and extending generally parallel to said longitudinal axis;

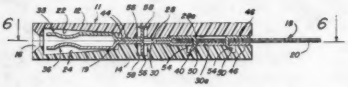
a flared entryway defined by an upper, flared extension of said pair of opposing wire gripping edges; and

wire retaining means comprising a generally laterally disposed wire retention groove formed in said side wall of said tubular sleeve section for temporarily retaining the electrical wire within said flared entryway in position for termination or connection within said wire receiving slot, said wire retention groove having upper and lower edges following the contour of said tubular sleeve section and including a neck portion of reduced width which is less than the diameter of the wire to be terminated, said wire retention groove further including a groove portion on each side of said neck portion with a width greater than the diameter of the wire to be terminated, said tubular sleeve section having a closed loop tubular portion disposed above said wire retention groove and said neck portion being disposed less than 180° from said wire receiving slot.

## 4,591,224
## ELECTRICAL CONNECTOR

Sil Araiza, 1895 W. Commonwealth, Unit L, Fullerton, Calif. 92633

Filed Mar. 8, 1985, Ser. No. 709,768
Int. Cl.[4] H01R 4/24
U.S. Cl. 339—97 C 10 Claims



1. An electrical female-connector unit of the type used with ribbon wire having a plurality of flat conductive elements enclosed therein, said female-connector unit comprising:

a housing having a first housing section and a second housing section;

means formed between said housing sections for coupling said sections together to define said housing;

at least one pair of contact fingers mounted between said first and second housing sections, and adapted to receive a male-connector pin;

means formed in said housing sections and said contact finger for aligning said contact fingers longitudinally within said housing; and

means formed in said contact fingers for stapling said fingers to each other and said ribbon wire, wherein said stapling means further defines terminal means for engaging said conductive elements of said ribbon wire.

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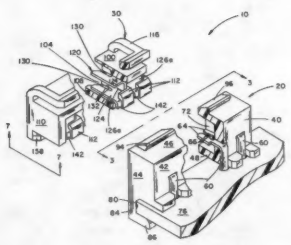
## 4,591,225
## ARRANGEMENT FOR INTERCONNECTING A PRINTED CIRCUIT BOARD WITH A MULTI-CONDUCTOR CABLE

Andrew Squitieri, Downers Grove, Ill., assignor to Molex Incorporated, Lisle, Ill.

Filed Jan. 14, 1985, Ser. No. 691,327
Int. Cl.[4] H01R 4/24
U.S. Cl. 339—99 R 9 Claims



1. An electrical connector arrangement for interconnecting an external circuit member to an insulated cable having a plurality of conductors surrounded by electrical insulation, the connector arrangement including

a receptacle connector having a housing with a plurality of integral, stamped, metallic receptacle terminals mounted therein each having a mating end defining a tuning fork portion with opposed spaced-apart contacting surfaces and an opposite end for electrical association with said external circuit member,

a plug connector mateable with said receptacle connector having a plug housing with a plurality of plug terminals mounted therein each having a mating end defining a generally flat blade portion adapted to be received between and in electrical contact with the contact surfaces of the tuning fork portion and a cable engaging end for electrical connection to the cable,

the improvement in said plug terminals comprising:

an elongated, integral, stamped, metallic, generally U-shaped channel extending between opposing cable engaging and mating ends and including a first elongated terminal wall, a second terminal wall extending laterally of a longitudinal edge of said first wall, and a third terminal wall spaced-apart and parallel to said second terminal wall and extending laterally from an opposite longitudinal edge of the first wall to define said U-shaped channel, the first wall having the blade portion at the mating end thereof and the second and third walls each having an insulation displacement slot formed therein and extending from the able engaging end thereof, the slots aligned with each other to receive the insulated cable therein and displace the insulation to electrically contact one of the conductors.

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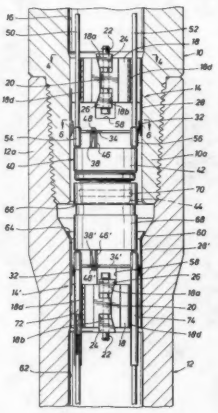
## 4,591,226
## ANNULAR ELECTRICAL CONNECTORS FOR DRILL STRING

Hoke S. Hargett; Charles E. Barton, both of Houston, and William D. Boles, Kingwood, all of Tex., assignors to NL Industries, Inc., New York, N.Y.

Filed Jan. 31, 1983, Ser. No. 462,662
Int. Cl.[4] H01R 4/64
U.S. Cl. 339—117 R 46 Claims



1. Electrical communication apparatus suitable for use in a section of well conduit, comprising:

a generally annular male electrical coupler assembly comprising a first base structure for rigid connection to a first end of said section of said well conduit and first annular electrical contact means carried by said first base structure;

first mounting means associated with said male coupler assembly for releasably mounting said first base structure of said male coupler assembly generally coaxially in said first end of said section of said well conduit;

a generally annualar female electrical coupler assembly comprising a second base structure for rigid connection to a second end of said section of said well conduit and second annular electrical contact means carried by said second base structure;

second mounting means associated with said female coupler assembly for releasably mounting said base structure of said female coupler assembly generally coaxially in said second end of said section of said well conduit;

the contact means of at least one of said coupler assemblies being mounted for limited lateral and circumferential play with respect to its base structure; and

electrical transfer means interconnecting said male and female coupler assemblies, said transfer means comprising an electrical cable electrically connected to each of said coupler assemblies for conducting electric current therebetween.

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**4,591,227**

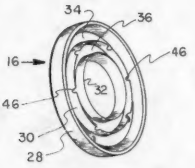
## CHRISTMAS TREE LIGHT SET

**John P. Colonna, 6100 Midnight Pass Rd., Apt. 1183, Sarasota, Fla. 34242**

**Continuation of Ser. No. 553,835, Nov. 21, 1983, abandoned. This application Nov. 15, 1985, Ser. No. 798,710**

**Int. Cl.[4] H01R** *21/00*

**U.S. Cl. 339—157 C** **12 Claims**




1. An electrical light set for decorating and illuminating Christmas trees and the like, comprising:

(a) a ring-shaped conductor housing formed from an electrical insulating material, said ring-shaped conductor housing having (i) an open topped main body with an outer wall, a dividing wall and an inner wall which circumscribe a first ring-shaped conductor channel in its interior, said first ring shaped conductor channel having a plurality of holes through its base, and, concentric with said first ring-shaped conductor channel, a second ring-shaped conductor channel in its interior, said second ring-shaped conductor channel having a hole through its base, said dividing wall having a plurality of openings therethrough, and (ii) a ring-shaped cover plate formed from an electrical insulating material, said ring-shaped cover plate being permanently sealed in the open top of said open topped main body;

(b) a pair of electrical feed wires, each of said electrical feed wires having one of its ends connected to a plug having prongs for insertion in the openings of an electrical outlet, one of said electrical feed wires having the other of its ends passed through one of said holes in said base of said first ring-shaped conductor channel, and the other of said electrical feed wires having the other of its ends passed through said hole in said base of said second ring-shaped conductor channel; and

(c) a plurality of pairs of electricl connecting wires, each of said pairs of electrical connecting wires being connected to a plurality of electrical light bulb sockets, and each of said pairs of electrical connecting wires having the same end of each of said electrical connecting wires in the pair passed through one of said holes in said base of said first ring-shaped conductor channel;

said electrical feed wires and said electrical connecting wires being appropriately crossed over between said first ring-shaped conductor channel and said second ring-shaped conductor channel through said openings through said dividing wall and permanently connected in the interior of said open topped main body of said ring-shaped conductor housing to create an electrical circuit which is appropriate for the number of said pairs of electrical connecting wires, the number of said light bulb sockets connected to each of said pairs of electrical connecting wires, and the voltage rating of the light bulbs intended for use in said light bulb sockets.

**4,591,228**

## MECHANICAL FASTENING DEVICE FOR ASSEMBLING ELECTRICAL EQUIPMENT MODULES

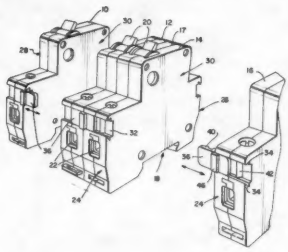
**André Vasseur, Soignies, Belgium, assignor to Merlin Gerin, Grenoble, France**

**Filed Aug. 2, 1984, Ser. No. 637,263**

**Claims priority, application France, Aug. 17, 1983, 83 13466**

**Int. Cl.[4] H01R** *9/26*

**U.S. Cl. 339—198 H** **6 Claims**




1. A fastening device for assembling together at least two modular casings in a side by side relationship, said fastening device comprising:

a groove provided in a face of each of said casings, the groove of one casing being aligned with the groove of an adjacent casing to form a channel across said faces of said casings, each of said grooves having first engaging surfaces;

a connecting slide slidably mounted in said groove for selective reciprocal movement in said channel between a fastened position and a disengaged position, said slide having a guide portion for guiding the slide in the groove and a second engaging surface at each end of said slide;

one of the second engaging surfaces of said slide engaging one of the first engaging surfaces on the groove of one casing and another of the second engaging surfaces of said slide engaging another of the first engaging surfaces on the grooves of an adjacent casing in the fastened position of said slide, the distance between the second engaging surfaces on said slide corresponding to the distance between said first engaging surfaces on said one casing and said adjacent casing, the distance between said second engaging surfaces being no greater than the width of said face of said casing.

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**4,591,229**

## GROUNDING STRAP

**Isaac Sachs, 1240 Ridgewood Drive, Chomedey Laval, Quebec, Canada H7W 1L3**

**Continuation of Ser. No. 448,750, Dec. 10, 1982, abandoned. This application Feb. 19, 1985, Ser. No. 702,429**

**Int. Cl.[4] H01R** *13/24*

**U.S. Cl. 339—251** **3 Claims**

1. A one-piece pliable metal grounding strap comprising:

an exterior U-shaped section having a pair of leg portions interconnected by a preformed bight portion;

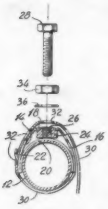
one of said leg portions having a preformed inwardly bent interior U-shaped section having leg portions extending adjacent to respective leg portions of the exterior U-shaped section, said interior U-shaped section extending adjacent and across said preformed bight portion in opposed spaced apart relation thereto and being adapted to contact on one surface thereof opposite said exterior U-shaped section a ground member;

a hook member outwardly projecting from said one leg portion;

a collar member fixed to said bight portion, said collar member having a threaded bore defining a longitudinal axis and

adapted to threadably engage a screw member, said bight portion having preformed bends on opposite sides of said collar member such that said longitudinal axis of said threaded bore of said collar member is oriented perpendicular to a part of said said interior U-shaped section directly opposite said collar member to permit said screw member to frictionally engage said interior U-shaped section on the other surface thereof substantially perpendicularly thereto;

the other leg portion of said exterior U-shaped section having a length extended relative to said one leg portion thereof to define an elongated wrap section adapted to be bent about said ground member and over said one leg portion and said bight portion with said ground member disposed between said interior U-shaped section and said wrap section, said wrap section being provided with a plurality of longitudinally spaced apart apertures adapted



to receive said hook member and to register with said threaded bore for receiving said screw member, whereby tightening of said screw member causes said screw member to frictionally engage with the other surface of said interior U-shaped section facing said exterior U-shaped section and causes said one surface of said interior U-shaped section to frictionally engage with said ground member and to move said bight portion in a direction away from said interior U-shaped section, thereby causing said hook member to pull said wrap section in the same direction and to tighten same against said ground member;

whereby said preformed bight portion and said interior U-shaped section with the leg portions thereof extending adjacent respective leg portions of the exterior U-shaped section maintain said screw member perpendicular to said interior U-shaped section during tightening of said screw member.

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**4,591,230**

## ELECTRICAL CONNECTOR RECEPTACLE

**Frank Roldan, 937 Paularino Ave., Costa Mesa, Calif. 92626**

**Filed Jun. 29, 1984, Ser. No. 626,148**

**Int. Cl.[4] H01R** *13/115*

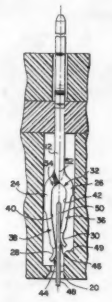
**U.S. Cl. 339—258 R** **17 Claims**

1. A receptacle contact for receiving a male contact member, with the male contact member having a longitudinal centerline axis lying in a mating plane, comprising:

a generally flat metal body having a center plane parallel to the mating plane;

a first leg and a second leg having respective shoes stamp formed from the metal body and extending from a lower section of the body by removing a longitudinal elongated section of the metal intermediate the first and second legs, the width of material removed by stamping of the longitudinal elongated section being equal to the offset width of the respective shoes from their associated leg to provide a pair of parallel elongated rectangular legs, and removing a portion of the metal bordering adjacent both the side of the first leg and the end of the second leg to provide a pair of offset shoes having a wider dimension than the width of each leg, both shoes being offset to the adjacent inside surface of each leg and the legs being cantilevered from the lower body section thereby forming each leg into an L-shape, with the first leg shoe extending further from the lower body section and overlapping the second leg section along the longitudinal centerline axis;

the first leg and second leg being bent from their parallel position to deformably move an inner edge of one leg transversely past an inner edge of the other leg so that the legs are out of the center plane; and



the first leg and the second leg being further bent to partially overlap each other and with the centerline of each generally aligned with the centerline of a received male contact member at least along a mating region of each leg, each of the first and second legs being further bent towards the mating plane and forming a breakpoint on each leg at the location of the further bend, with the distance between the breakpoint and the shoe member on each leg being approximately equal.

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**4,591,231**

## VARIABLE OPTICAL ATTENUATOR

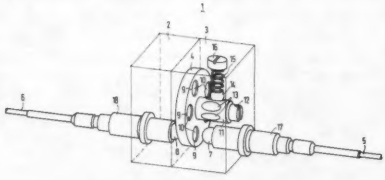
**Manfred Kaiser, Hemmingen, and Wolfgang Stiepek, Stuttgart, both of Fed. Rep. of Germany, assignors to International Standard Electric Corporation, New York, N.Y.**

**Continuation of Ser. No. 502,375, Jun. 8, 1983, abandoned. This application May 28, 1985, Ser. No. 738,550**

**Claims priority, application Fed. Rep. of Germany, Jun. 26, 1982, 3223898**

**Int. Cl.[4] G02B** *5/22, 6/32*

**U.S. Cl. 350—96.18** **2 Claims**



1. A variable optical attenuator comprising:

a housing having opposite outside walls;

two waveguiding elements each being centered on a longitudinal axis and having end faces, said elements passing through said opposite outside walls and being positioned such that said longitudinal axes thereof coincide and respective ones of said end faces face each other and are axially spaced from one another;

two spherical lenses, each positioned at one of said respective end faces;

a disk having two substantially planar surfaces positioned between said spherical lenses, each of said surfaces facing one of said lenses;

a plurality of neutral density filters extending through said disk and around the periphery thereof, each of said filters having a different attenuation characteristic and extending in a plane which makes an angle other than 90° with the longitudinal axis of the light emerging from one of said waveguiding elements; and

a shaft extending from said disk through one of said opposite outside walls, said shaft having a slotted end as well as having a number of depressed seats therein, a compression spring connected to an outside wall of said housing by a screw, and a ball in contact with said spring and said shaft whereby said shaft may be rotated in determinate steps between a number of angularly displaced positions equal to the number of seats in each of which positions a different one of said filters is aligned with said lenses to allow light emerging from one of said waveguiding elements through a respective one of said lenses in parallel rays to pass through the respective filter and be received through a respective other one of said lenses by said other waveguiding element.

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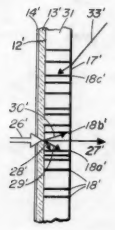
**4,591,232**

## OPTICAL DISPLAY SCREEN UTILIZING LIGHT-ABSORBING FIBERS

**Richard V. Jeskey, Fiskdale, Mass., assignor to Incom, Inc., Southbridge, Mass.**

**Filed Jun. 3, 1983, Ser. No. 500,623**
**Int. Cl.⁴ G02B *6/08***
**U.S. Cl. 350—96.27** **21 Claims**




1. An optical display screen, comprising:

(a) an optically-transparent matrix of material of uniform index of refraction and coefficient of thermal expansion, the matrix having inner and outer substantially parallel surfaces,

(b) a layer of material on the inner surface adapted to be controllably induced to emit light, and

(c) a plurality of elongated light-absorbing fibers integrally embedded in said transparent matrix, the fibers parallel to each other and aligned in a direction essentially normal to said surfaces, the matrix and fibers together constituting a transparent layer.

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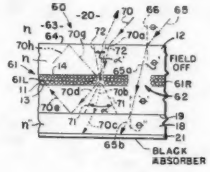
**4,591,233**

## ENHANCED SCATTERING IN VOLTAGE SENSITIVE ENCAPSULATED LIQUID CRYSTAL WITH SPACED APART ABSORBER

**James L. Fergason, Altherton, Calif., assignor to Manchester R & D Partnership, Pepper Pike, Ohio**

**Division of Ser. No. 477,138, Mar. 21, 1983, which is a continuation-in-part of Ser. No. 302,780, Sep. 16, 1981, Pat. No. 4,435,047. This application Apr. 29, 1985, Ser. No. 728,497**
**Int. Cl.⁴ G02F *1/13***
**U.S. Cl. 350—334** **32 Claims**

1. Liquid crystal apparatus comprising liquid crystal means for selectively primarily scattering or transmitting light in response to a prescribed input, said liquid crystal means comprising operationally nematic liquid crystal material having positive dielectric anisotropy, a support medium means for supporting said liquid crystal means, and reflecting means for effecting total internal reflection of light scattered by said liquid crystal means, said support medium means having a viewing side for emitting at least some light isotropically scattered by said liquid crystal means and an opposite side relative to said viewing side, and further comprising optical absorbing means for absorbing light transmitted through said opposite side of said support medium means.

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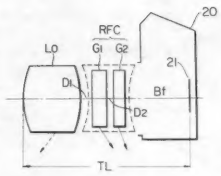
**4,591,234**

## REAR FOCUS CONVERSION LENS

**Yoshinari Hamanishi, Tokyo, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan**

**Filed Jan. 21, 1983, Ser. No. 459,980**
**Claims priority, application Japan, Jan. 27, 1982, 57-32194; Apr. 23, 1982, 57-67061**
**Int. Cl.⁴ G02B *9/34, 9/60, 15/02***
**U.S. Cl. 350—422** **32 Claims**




12. A rear conversion lens removably mounted between an objective lens and a camera body and having a negative refractive power for making the combined focal length of the rear conversion lens and the objective lens greater than the focal length of the objective lens, said rear conversion lens including:

a forward group having a plurality of lenses; and

a rearward group having at least one lens;

said forward group and said rearward group being movable relative to each other along the optical axis, focusing to objects from infinity to a short distance being accomplished by relative movement of said two groups and the relative movement of said two groups being such that the aberration fluctuation occurring when the rear conversion lens is focused to a short distance object can be offset.

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**4,591,235**

## ZOOM LENS SYSTEM

**Hisashi Tokumaru, and Shuji Ogino, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 30, 1982, Ser. No. 445,528**
**Claims priority, application Japan, Nov. 30, 1981, 56-192492**
**Int. Cl.⁴ G02B *15/14, 15/177***
**U.S. Cl. 350—427** **14 Claims**

1. A zoom lens system comprising:

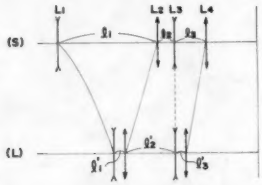
a first lens group of a negative refractive power including a negative lens at the object side end of the first lens group;

a second lens group of a positive refractive power located on

the image side of the first lens group with a first variable air space between the first and second lens groups;

a third lens group of a negative refractive power located on the image side of the second lens group with a second variable air space between the second and third lens groups; and

a fourth lens group of a positive refractive power located on




the image side of the third lens group with a third variable air space between the third lens group and the fourth lens group, wherein the first and third variable air spaces are reduced and the second variable air space is increased in accordance with the increase of the focal length of the whole lens system by means of the axial movements of the first, second and fourth lens groups with the third lens group left stationary during the zooming.

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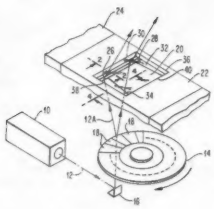
**4,591,236**

## OPTICAL SCANNER WITH BEAM DIRECTING HOLOGRAMS AT WINDOW

**Eric C. Broockman, and Robert S. Fortenberry, both of Raleigh, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 13, 1984, Ser. No. 579,633**
**Int. Cl.[4] G02B *27/17***
**U.S. Cl. 350—3.71** **14 Claims**



**1.** An optical scanner apparatus of the type including an enclosure, a coherent light source located within the enclosure, a transparent window in one wall of the enclosure and means for deflecting a light beam from the source along scan lines traversing the transparent window, the improvement comprising light directing means contiguous to the transparent window for redirecting an impinging light beam along a predetermined ray as it exits from the transparent window.

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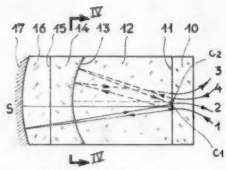
**4,591,237**

## COUPLER EXTRACTING AN OPTICAL SIGNAL

**Jean-Pierre Laude, St Cyr la Riviere, France, assignor to Instruments SA, France**

**Continuation-in-part of Ser. No. 372,716, Apr. 28, 1982, abandoned. This application Oct. 13, 1983, Ser. No. 541,747**
**Claims priority, application France, Nov. 18, 1982, 82 19284**
**Int. Cl.[4] G02B *6/26***
**U.S. Cl. 350—96.15** **5 Claims**

**1.** A coupler for extracting an optical signal traveling from a first upstream input transmission fiber to a downstream output transmission fiber, while allowing the continuity of transmission between the input and output fibers, by extracting a part of said optical signal for detection, and/or for coupling to the downstream fiber a new signal coming from a transmitter, comprising, a first concave spherical mirror with an apex and a first center, and in which the end of the upstream transmission fiber is arranged in a plane perpendicular at said first center to the axis defined by said apex and said first center, at a position which is slightly offset relative to said first center, whereby the image of said input fiber made by said mirror is formed symmetrically relative to said first center on the end of said downstream fiber, a second concave spherical mirror




having a reflecting area smaller than the reflecting area of said first mirror and placed between the first mirror and said plane, said second mirror having limited area reflecting zones distributed symmetrically relative to its own apex, and having a second center in said plane, said second center being slightly offset relative to said first center of said first mirror, and wherein the ends of a third fiber communicating with a detector and of a fourth fiber communicating with a transmitter are arranged in said plane symmetrically, respectively, to the end of said first fiber and of said second fiber relative to said second center.

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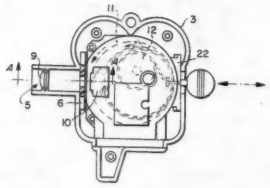
**4,591,238**

## MOVIE PROJECTOR PENDANT

**Teruhiko Kitaoka, and Hajime Matsumoto, both of Chiba, Japan, assignors to Toybox Corporation, Tokyo, Japan**

**Filed Jun. 13, 1983, Ser. No. 503,537**
**Int. Cl.[4] G03B *21/00***
**U.S. Cl. 353—122** **2 Claims**




**1.** A minature amusement device for viewing a continuous loop movie film including a series of frames, comprising:

a housing having a light entrance port positioned in a first side of the housing, an access port and a light exit port positioned in a second side of the housing adjacent to the first side, and having a substantially cylindrical portion formed therein;

a continuous loop movie film positioned within the substantially cylindrical portion of said housing such that said film forms a helix with all of the film being within the substantially cylindrical portion;

a mirror mounted within said housing and positioned within said helix of film in a manner so as to form a light path between said light entrance port and said light exit port such that a portion of said film traverses said light path;

a lens system mounted within a portion of said housing outside said cylindrical portion and within said light path;

drive means mounted within said housing and positioned along the longitudinal axis of and within said helix of film, for moving said part of said film through said light path, said drive means including:

a spring mechanism;

a cord operatively connected to said spring mechanism and extending outwardly from said housing, such that said spring mechanism is wound as said cord is pulled,

a cam mounted on and rotated by said spring mechanism;

a guide pin mounted on said spring mechanism; and

a sprocket arm slidably mounted on said cam and said guide pin for engaging and moving the continuous loop movie film through the light path in accordance with the rotation of said cam; and

framing means, having a slot formed therein and a protuberance and being slidably mounted within said housing and outside said cylindrical portion such that said protuberance slidably engages said access port in said housing and said slot is positioned within said light path, for selectively viewing said portion of the continuous loop movie film traversing the light path by sliding said protuberance within said access port to enable said series of frames to be viewed.

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**4,591,239**

## OPTICAL LENS HOLDER

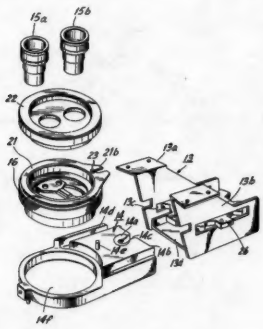
**Kiyoji Nakamura, Ayase, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Mar. 29, 1984, Ser. No. 594,712**

**Claims priority, application Japan, Mar. 31, 1983, 58-45811[U]; Mar. 31, 1983, 58-45812[U]**

**Int. Cl.⁴ G02B *7/02, 7/04***

**U.S. Cl. 350—254** **5 Claims**




1. An optical lens holder comprising: a guide member to be secured on a main body of an optical apparatus, said guide member having a sliding member and also having a stopper at an end thereof, an inserting member slidable along said sliding member into said guide member and having a tip end for abutment against said stopper and also having an inclined surface, a receptacle member on said guide member, an engaging member engageable in said receptacle member and having a contacting surface corresponding to said inclined surface, said engaging member pushing said tip end of said inserting member onto said stopper with a component of the force generated by sliding contact of said contact surface on said inclined surface when said enagaging member is engaged by said receptacle member, a focus ring having an inner circumference with a threaded portion, and mounted into said inserting member in a freely rotatable manner, a lower member in the form of a ring having an outer circumference with a threaded portion mated with the threaded portion of said focus ring but being non-rotatable, and an upper member mounted on the lower member in a rotatable manner and holding at least one lens in a mountable/demountable manner.

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**4,591,240**

## LIQUID CRYSTAL DISPLAY ELEMENT HAVING COLORED RESIN MASKING LAYER

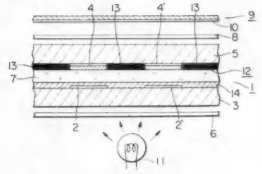
**Yuichi Masaki, Kawasaki, and Yoshio Hotta, Atsugi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 28, 1983, Ser. No. 508,592**

**Claims priority, application Japan, Jul. 7, 1982, 57-119061**

**Int. Cl.⁴ G02F *1/13***

**U.S. Cl. 350—339 R** **7 Claims**




1. A liquid crystal element comprising a liquid crystal cell between a pair of polarizing plates, said liquid crystal cell comprising a liquid crystal between a plate supporting two or more common electrodes and a plate supporting a segment electrode, wherein said plate supporting said two or more common electrodes is provided with a light-intercepting mask which is formed from a water-soluble resin and colored, and said mask is spaced between two or more common electrodes, and the plate supporting the segment electrode is provided with a light intercepting mask on the area other than the patterned segment electrode area.

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**4,591,241**

## ACOUSTO-OPTICAL SPECTRUM ANALYZER

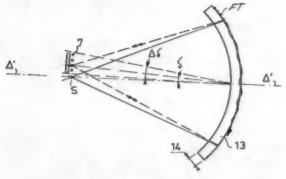
**Jean-Pierre Huignard, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Nov. 7, 1983, Ser. No. 549,443**

**Claims priority, application France, Nov. 16, 1982, 82 19141**

**Int. Cl.⁴ G02F *1/33;* G01R *23/16***

**U.S. Cl. 350—358** **4 Claims**

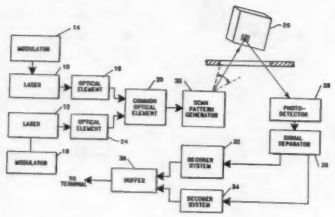



1. A spectrum analyzer comprising a light source supplying a collimated light beam, a piezoelectric, elasto-optical interaction medium, a transducer which generates an acousto-optical wave in this medium, said acousto-optical wave creating an index grating with a specific spacing, propagating at the velocity of sound $V_S$ in the said medium, said transducer being subject to the action of a control signal, and a line of detectors for detecting the spectrum of the control signal, the light beam being diffracted by this index grating in order to reach the line of detectors, wherein the source is positioned in the vicinity of the centre of curvature of the interaction medium, which is in the form of a spherical cap or cup, the transducer being in the form of a split-finger transducer deposited on the opposite face of the spherical cap or cup with respect to the source, the acousto-optical wave generator being a surface wave.

## 4,591,242
## OPTICAL SCANNER HAVING MULTIPLE, SIMULTANEOUS SCAN LINES WITH DIFFERENT FOCAL LENGTHS

**Eric C. Broockman; Robert T. Cato, and LeRoy D. Dickson, all of Raleigh, N.C., assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Feb. 13, 1984, Ser. No. 579,634**
**Int. Cl.[4] G02B *26/10***
**U.S. Cl. 350—3.71** **10 Claims**

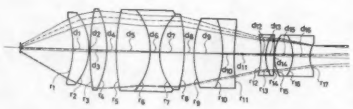


1. An article scanner comprising:
means for generating a plurality of light beams, each having a predetermined characteristic;
means for focusing each of the beams at a different, predetermined focal length;
beam deflecting means in the path of said plurality of light beams for generating simultaneous scan lines, each of said simultaneously generated scan lines being focused in a plane at a different distance from said beam deflecting means;
detector means for generating a single signal which varies in accordance with the total optical energy reflected from an article in the path of the scan lines;
means for separating the single signal into a plurality of constituent signals as a function of the predetermined characteristic of each of the beams, each constituent signal varying as a function of the reflected optical energy produced by a given one of the plurality of light beams.

## 4,591,243
## MICROSCOPE OBJECTIVE

**Masaaki Yamagishi, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Jan. 24, 1985, Ser. No. 694,632**
**Claims priority, application Japan, Jan. 30, 1984, 59-13512**
**Int. Cl.[4] G02B *9/62, 21/02***
**U.S. Cl. 350—414** **8 Claims**



1. A microscope objective comprising a first lens component arranged as a positive meniscus lens having a concave surface on the object side, a second lens component arranged as a positive lens, a third lens component comprising a positive lens element and having positive refractive power as a whole, a fourth lens component comprising a positive lens element and having positive refractive power as a whole, a fifth lens component comprising a negative lens element and having negative refractive power as a whole, and a sixth lens component arranged as a cemented positive meniscus lens, said microscope objective being arranged to fulfill the conditions (1) through (6) shown below:

$$1.8f < |f_{VVI}| < 2.6f, f_{VVI} < 0 \quad (1)$$

$$1.2 < r_1/r_2 < 1.8 \quad (2)$$

$$2 < |r_3/r_4| < 3.7, r_3/r_4 < 0 \quad (3)$$

$$\nu_{IIp}, \nu_{IIIp-1} > 65 \quad (4)$$

$$3.5f < |r_{12}/(n_{V-1} - 1)| < 5.2f \quad (5)$$
$$r_{12}/(n_{V-1} - 1) < 0$$

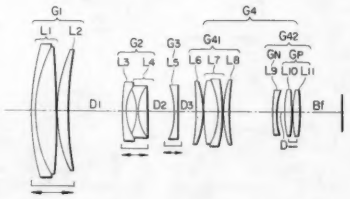
$$1.5f < |r_{17}/(1 - n_{VI-2})| < 2f \quad (6)$$
$$r_{17}/(1 - n_{VI-2}) < 0$$

where, reference symbol f represents the focal length of the lens system as a whole, reference symbol $f_{VVI}$ represents the total focal length of the fifth and sixth lens components, reference symbols $r_1$ and $r_2$ respectively represent radii of curvature of the surface on the object side and surface on the image side of the first lens component, reference symbols $r_3$ and $r_4$ respectively represent radii of curvature of the surface on the object side and surface on the image side of the second lens component, reference symbol $\nu_{IIp}$ represents Abbe's number of the positive lens constituting the second lens component, and reference symbol $\nu_{IIIp-1}$ represents Abbe's number of the first positive lens element counted from the object side in the third lens component, reference symbol $r_{12}$ represents the radius of curvature of the surface on the object side of the fifth lens component, reference symbol $n_{V-1}$ represents the refractive index of the first negative lens element counted from the object side in the fifth lens component, reference symbol $r_{17}$ represents the side of the sixth lens component, and reference symbol $n_{VI-2}$ represents the refractive index of the second negative lens element counted from the object side in the sixth lens component.

## 4,591,244
## ZOOM LENS

**Yasuhiro Aono, Kawasaki, and Koichi Matsumoto, Ohyaguchi Kita, both of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan**

**Filed Jun. 2, 1983, Ser. No. 500,395**
**Claims priority, application Japan, Jun. 7, 1982, 57-97370; Jun. 7, 1982, 57-97371**
**Int. Cl.[4] G02B *15/00***
**U.S. Cl. 350—427** **12 Claims**



1. A telecentric compact zoom lens with a long back-focus length comprising, in the order from the object side:
a focusing lens unit of a positive refractive power;
a variator lens unit of a negative refractive power;
a compensator lens unit of a negative refractive power; and
a relay lens unit comprising a front lens group of a positive refractive power and a rear lens group of a positive refractive power including a negative lens component and a positive lens component positioned behind said negative lens component with a predetermined distance therefrom, light beams at the object side of said negative lens component being convergent and light beams at the image side of

said negative lens component being approximately parallel,

wherein said zoom lens satisfies the following relations:

$$0.3 < |f_{41}/f_{42}| < 0.5$$

$$0.25 < |f_N/f_{42}| < 0.9$$

$$0.05 < |D/f_{42}| < 0.17$$

$$-2.0 < (r_b + r_a)/(r_b - r_a) < -0.9$$

where $f_{41}$ and $f_{42}$ respectively stand for the focal lengths of the front and rear lens group of said relay lens unit, $f_N$ stands for the focal length of the negative lens component of the rear lens group, D stands for the distance between said negative and positive lens components, and $r_a$ and $r_b$ respectively stand for radii of curvature at the object side and at the image side of the negative lens componet in said rear relay lens group.

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**4,591,245**

## FOCUSING ARRANGEMENT FOR A REFLECTING TELESCOPE

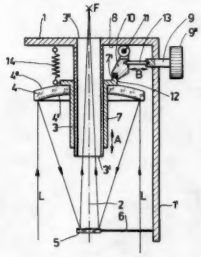
**Michael Schreiter, 20, Brucknerstr., 5300 Weimar, District of Erfurt, German Democratic Rep.**

**Filed Jul. 5, 1983, Ser. No. 511,066**

**Claims priority, application German Democratic Rep., Jul. 27, 1982, 241966**

**Int. Cl.[4] G02B *17/00***

**U.S. Cl. 350—504** **2 Claims**



1. An arrangement for focusing a reflecting telescope having a primary reflector and a secondary reflector optically aligned to one another about a common optical axis,

comprising

a cylindrical housing having a cylinder axis,

said cylinder axis being coincident with said optical axis,

said cylindrical housing having a rear face and a side wall,

a tubular guide means being secured to said rear face symmetrically to said optical axis,

a tubular reflector mount being for fitting about said tubular guide means,

said tubular reflector mount being displaceable along said tubular guide means,

said tubular reflector mount being provided with a nose portion in opposition to said rear face, said primary reflector having a further rear face in opposition to said rear face, and a central opening,

said primary reflector being mounted via said central opening to said tubular reflector mount,

a lever gear means,

an adjustment screw being provided in said side wall adjacent said rear face,

said lever gear means having a first end portion adjacent said nose, a second end portion adjacent said rear face, and a central portion in opposition to said adjustment screw,

said nose and said first end portion being connected to one another via a pivot,

said rear face and said second end portion being connected via a connection means,

said connection means between said rear face and said second end portion being a roller secured to said end portion and moving on said rear face,

a connection rod,

said connection rod being for frictionally connecting said central portion to said screw,

at least one spring means having two end portions, one of said end portions being connected to said tubular mount adjacent said further rear face in diametrical opposition about said optical axis relative to said nose, the other of said end portions being connected to said rear face,

said spring means being for forcing said primary reflector via its tubular mount towards said rear face,

said screw, when rotated, being for displacing said primary reflector via said tubular mount,

said nose, said pivot, said lever gear means and said connection rod, along said tubular guide means in action with and counteraction, respectively, to said spring means.

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**4,591,246**

## OCULAR PARAMETER MEASURING DEVICE

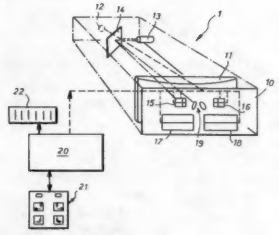
**Bernard Cousyn, Vincennes; Ahmed Haddadi, Nogent-sur-Marne, and Jean-Claude Hennequin, Congis-sur-Therouanne, all of France, assignors to Essilor International, Compagnie Generale d'Optique, Creteil, France**

**Filed Dec. 20, 1983, Ser. No. 563,559**

**Claims priority, application France, Dec. 22, 1982, 82 21537**

**Int. Cl.[4] A61B *3/10***

**U.S. Cl. 351—204** **4 Claims**



1. A device for measuring the ocular parameters of a subject, in particular the interpupillary distance, for the purpose of fitting a pair of spectacles, the device comprising a front panel, means on said front panel for establishing its position relative to the face of the subject, windows in said front panel corresponding to the positions of the lenses of a pair of spectacles to be fitted, optical means incorporating a convergent lens and having an optical axis normal to and centered on said front panel, means for adjusting the position of said convergent lens along said optical axis relative to an origin close to said front panel, a point source of light, an aiming hole optically coincident with said point source of light, said point source of light and said aiming hole being disposed on a side of said convergent lens opposite to said front panel and on the focus of said convergent lens when at said origin to said front panel, two graticules disposed in the plane of said front panel and each comprising at least one liquid crystal diascopic matrix with addressable lines and columns, means, incorporating digital address generating means, for adjusting the position of each graticule within the frame of a respective window and position indicators linked to said adjusting means.

**4,591,247**

## EYE REFRACTOMETER

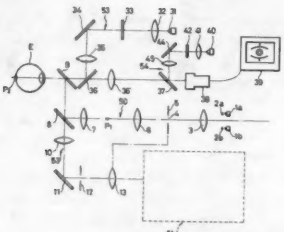
**Minoru Kamiya; Masayuki Masuyama; Ikuo Kitao; Shinji Wada, and Kiwami Horiguchi, all of Tokyo, Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 2, 1982, Ser. No. 384,338**

**Claims priority, application Japan, Jun. 3, 1981, 56-85489; Jul. 22, 1981, 56-114933**

**Int. Cl.[4] A61B *3/10***

**U.S. Cl. 351—211** **6 Claims**



**1.** An eye refractometer comprising:

a measuring target projection optical system for projecting first measuring target images from a pair of beams of light from a measuring target along an optical axis to the eye fundus of a patient's eye;

a measuring target image-forming optical system for forming, on a plane perpendicular to the optical axis, second measuring target images of said beams of light projected from said measuring target to the eye fundus;

detection means for detecting the positions of second target images formed on said plane;

a target position control system for moving said target to a position along the optical axis substantially conjugate with the eye fundus of the patient's eye in the predetermined measuring direction in accordance with signals from said detection means, and for fixing the target at said position along the optical axis;

rotation means for rotating said pair of beams of light around the optical axis while the target is fixed at said position along the optical axis; and

refractive power calculating means for (1) calculating the refractive powers in at least three meridian directions from signals produced by said detecting means in response to the amount of separation of the two images in the measured meridian direction when the beams of light from said target fixed in said position are rotated around the optical axis, and for (2) calculating spherical power, cylindrical power, and the direction of the cylindrical axis from said signals.

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**4,591,248**

## DYNAMIC AUDIENCE RESPONSIVE MOVIE SYSTEM

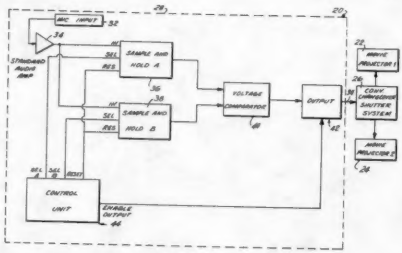
**Michael J. Freeman, 31 Cornwall La., Sands Point, N.Y. 11050**

**Continuation-in-part of Ser. No. 371,415, Apr. 23, 1982, abandoned, Continuation-in-part of Ser. No. 321,478, Nov. 16, 1981, abandoned. This application Apr. 27, 1983, Ser. No. 489,170**

**Int. Cl.[4] G03B *19/18, 21/32***

**U.S. Cl. 352—133** **80 Claims**

**1.** In a movie changeover system comprising a pair of movie projection devices each having an associated portion of a substantially continuous overall motion picture presentation therefrom, each of said movies media having stored thereon a projectable portion of said overall motion picture presentation content, and a real-time changeover means operatively associated with said pair of projection device for selectively projecting a movie display of solely said movies media projectable portions from one of said pair of projection devices in a real time continuous mass audience movies display presentation with the previous movie display portion in response to a changeover signal; the improvement comprising a decision tree movie presentation stored on said movie media, said stored overall motion picture presentation content including said projectable portions thereof comprising said decision tree movie presentation, said stored decision tree movie presentation comprising first and second different branching choice movie display presentation portions at a common decision tree movie display branching point, each of said first and second branching choice movie display presentation portions having a different movie display content commonly associated with the movie display portion content preceding said common decision tree movie display branching point, each of said coextensive first and second branching choice movie display presentation portions being stored on a different one of said associated movie media, said preceding movie display portion content comprising a sampling interval prior to said common decision tree movie display branching point for concurrently sampling mass audience response of preferential selection of said first and second branching choice movie display presentation portions; means for concurrently detecting and sampling an audible first and second one of said audience responses, said concurrent detection and sampling means comprising means for discriminating between said first and second concurrently sampled mass audience audible responses, each concurrently



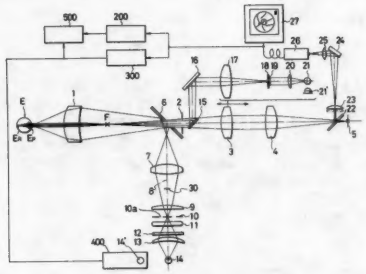

sampled mass audience audible response being associated with a different one of said first and second bracnhing choice movie display presentation portions for providing corresponding first and second mass audience response preferential signals respectively from said concurrently sampled mass audience response during said concurrent sampling interval, each of said mass audience response preferential signals having a relative signal value dependent on the associated mass audience response; and condition responsive means operatively connected to said concurrent detecting and sampling means for selectively providing said changeover signal to said changeover means substantially at said common decision tree movie display branching point directly in response to said detected relative signal values for enabling said selective projection of solely said movie media projectable portion corresponding to the previously sampled preferential first or second branching choice of the sampled mass audience based on said concurrently detected mass audience audible responses, said changeover means enabling said substantially continuous real time movie display presentation of solely the preferentially selected first or second branching choice movie display presentation portion substantially at said common decision tree movie display branching point; whereby a real time decision tree movie presentation having a variable movie display content dependent on a concurrent determination of a preferential mass audience response may be provided.

4,591,249

## EXPOSURE CONTROL SYSTEM FOR OPHTHALMIC PHOTOGRAPHING APPARATUS

Susumu Takahashi, and Kiwami Horiguchi, both of Tokyo, Japan, assignors to Tokyo Kagaku Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 28, 1984, Ser. No. 656,149
Claims priority, application Japan, Oct. 4, 1983, 58-185702
Int. Cl.[4] G03B *29/00*
U.S. Cl. 354—62 12 Claims



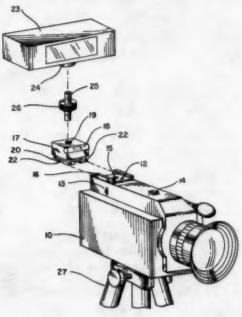
1. An ophthalmic photographing apparatus comprising an illuminating optical system for projecting beams of illuminating light to a subject to be photographed, a mark projecting optical system for projecting, together with the beams of illuminating light, a mark on the subject by a mark projecting light, a photographing optical system including a photographing film plane and optical means for producing an image of the subject on the film plane, photodetecting means for detecting a light which is a reflection of the mark projecting light at the retina to produce a mark signal, exposure control means including photographing light source means and means for controlling the light source means in accordance with the mark signal to control quantity of photographing light incident to the film plane so that a correct exposure is accomplished in photographing.

4,591,250

## LEVEL AND ACCESSORY MOUNTING ATTACHMENT FOR CAMERAS

Robert L. Woodruff, 435 Ryan Dr., Florissant, Mo. 63031

Filed Nov. 1, 1984, Ser. No. 667,102
Int. Cl.[4] G03B *15/05, 29/00*
U.S. Cl. 354—76 7 Claims



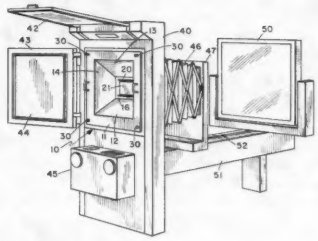
1. A leveling attachment for cameras which include an accessory shoe for the mounting of a flash attachment on a camera comprising a camera leveling module including a bubble level element having one orthogonal axis, and the camera leveling module including a mounting base engageable with the accessory shoe on either of two orthogonal axes whereby the bubble level element may have its axis extending from side-to-side or fore-to-aft on the camera.

4,591,251

## PROCESS CAMERA ADAPTER

Harrold Fisher, La Mesa, Calif., assignor to Cubic Corporation, San Diego, Calif.

Filed Apr. 8, 1985, Ser. No. 721,149
Int. Cl.[4] G03B *17/02, 27/58*
U.S. Cl. 354—159 9 Claims



1. A device for adapting a process-type camera so that it can be used with smaller film, the device comprising:

a cover member for mounting on a process-type camera having a back that defines a frame opening over which a sheet of film is normally placed for exposure, the cover member being shaped and dimensioned to fit on the camera back over the frame opening in place of a sheet of film and to include a recessed portion that is shaped and dimensioned to both extend through the frame opening to a selected focal plane ahead of the camera back and to define a secondary frame opening in the selected focal plane through which to expose film;

mounting means for removably mounting the cover member on the camera back; and

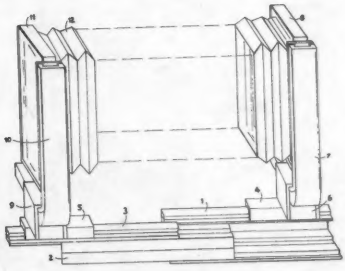
film holding means for holding film over the secondary frame opening for exposure.

4,591,252

## PHOTOGRAPHIC GROUND-GLASS PLATE CAMERA

Horst Huhle, Munich, Fed. Rep. of Germany, assignor to Linhof Präzisions-Kamera-Werke GmbH, Fed. Rep. of Germany

Filed Dec. 7, 1984, Ser. No. 679,296
Claims priority, application Fed. Rep. of Germany, Dec. 8, 1983, 3344362
Int. Cl.[4] G03B *17/04*
U.S. Cl. 354—191 6 Claims



1. A photographic camera comprising a camera base defin-

ing two parallel spaced apart guide rails for defining two slide paths which are spaced apart by a rail distance, an image carrier slide slidably mounted to one of said guide rails for sliding along one of said slide paths, a lens carrier slide slidably mounted to the other of said guide rails for sliding along the other of said slide paths, an image carrier standard pivotally mounted to said image carrier slide about a first axis extending perpendicularly to said one slide path and intersecting said one slide path, and a lens carrier standard pivotally mounted to said lens carrier slide about a second axis which is perpendicular to said other slide path and intersects said other slide path, said image carrier and lens carrier standards being movable on said slide paths to a spaced apart use position and movable toward each other to an adjacent storage position, said first and second axes being spaced apart by a slide path distance parallel to said slide paths which is at least equal to said rail distance between said slide paths when said standards are in their adjacent storage position.

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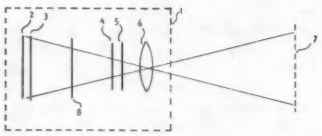
**4,591,253**

## ADAPTIVE VISION SYSTEM

**Joel Hecker, Port Jefferson Station, and Howard Stern, Greenlawn, both of N.Y., assignors to Robotic Vision Systems, Inc., East Hauppauge, N.Y.**

**Filed Oct. 6, 1983, Ser. No. 539,725**
**Int. Cl.[4] G03B** *9/56, 9/02*
**U.S. Cl. 354—227.1** **6 Claims**



1. An arrangement for electrically controlling depth of focus of a light-sensitive area in an optical device, comprising: a housing with light-sensitive area means; lens means for imaging an object onto said light-sensitive area means; shutter means for controlling exposure time; and aperture means for controlling the amount of light admitted by said housing comprised of electrically-controlled light modular means; said aperture being arranged to perform mathematical transform filtering of light for enhancing predetermined parts of the object.

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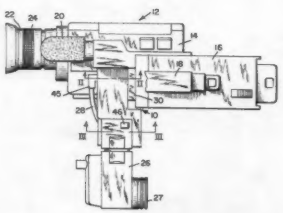
**4,591,254**

## ADAPTOR FOR T.V. CAMERA

**Bronislaw Sokolowski, 44 Aldrich St., Webster, Mass. 01570**

**Filed Oct. 26, 1984, Ser. No. 665,281**
**Int. Cl.[4] G03B** *13/02*
**U.S. Cl. 354—223** **8 Claims**



1. Adaptor for a video movie camera having a detachable viewfinder which is provided with a first fastening element that is adapted to engage a second fastening element on the camera to enable the viewfinder to be detachably mounted on the camera, the viewfinder extending laterally from one side of the camera for viewing with the eye of a person which is closest to said one side when the camera is being utilized for movie taking, said adaptor comprising:

(a) an elongated supporting body,

(b) a third fastening element which is located at one end of the body and which is adapted to engage said second fastening element to enable the adaptor to be detachably mounted on the camera, and

(c) a fourth fastening element at the opposite end of said body which is adapted to be engaged by said first fastening element for enabling the viewfinder to be detachably mounted on the adaptor for viewing with the person's opposite eye when the camera is being utilized for movie taking.

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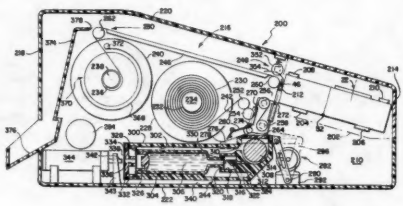
**4,591,255**

## APPARATUS FOR MOVING COATED SECTION OF SHEET MATERIAL INTO AND OUT OF ENGAGEMENT WITH FILM FRAME

**Paul B. Mason, Magnolia, and John B. Morse, Boston, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Nov. 28, 1984, Ser. No. 675,853**
**Int. Cl.[4] G03D** *5/06*
**U.S. Cl. 354—303** **5 Claims**



1. Apparatus for moving a length of flexible sheet material between a suply reel and a take-up reel at a substantially constant speed while simultaneously moving a portion of the flexible sheet material into and out of coating relation with a processing liquid applicator, said apparatus comprising:

a supply reel;

a take-up reel;

a length of flexible sheet material wound upon said supply reel with one end thereof secured to said supply reel and with its opposite end secured to said take-up reel;

means for guiding said flexible sheet material to a laminating station whereat a coated section of said flexible sheet material is moved into intimate contact with a premounted exposed film frame, said guiding means including first and second means about which said flexible sheet material is partially wrapped, said flexible sheet material defining a first path as it approaches said first means and second path as it leaves said second means, said first and second paths being parallel with each other;

a liquid applicator for applying a coating of processing liquid to a section of said flexible sheet material as it is being moved past said liquid applicator;

means for mounting said first and second means in fixed relation, said mounting means being movable between a first position, wherein one of said first and second means holds said flexible sheet material in coating relation with said liquid applicator, and a second position, wherein said flexible sheet material is out of coating relation with said liquid applicator, said first and second means moving in parallel relation to said first and second paths as said mounting means moves between said first and second position;

means for advancing said flexible sheet material from said supply reel toward said take-up reel as said mounting means moves between said first and second positions; and

means for moving said mounting means between said first and second positions.

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4,591,256

## BEAM SPLITTER AND LIGHT MEASURING DEVICE FOR CAMERA

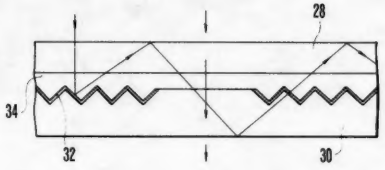
**Susumu Matsumura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 8, 1983, Ser. No. 550,238**

**Claims priority, application Japan, Nov. 8, 1982, 57-195763; Nov. 8, 1982, 57-195764**

**Int. Cl.⁴ G03B *3/00***

**U.S. Cl. 354—402** **7 Claims**




1. A beam splitter for splitting light from an object to a photometric device comprising:

(a) a first transparent plate;

(b) a second transparent plate superposed on said first transparent plate;

(c) a diffraction grating provided on a surface of said first transparent plate in opposed relationship to said second transparent plate, and having first areas with a reflection layer thereon and a second area with no reflection layer thereon, said second area being located between said first areas; and

(d) binder means for binding said first and said second transparent plates, said binder means having a refractive index which is the same as that of said first and said second transparent plates and filling a gap between said first and second transparent plates.

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4,591,257

## AUTOMATIC FOCUSING CAMERA

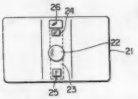
**Hiroshi Sawano, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

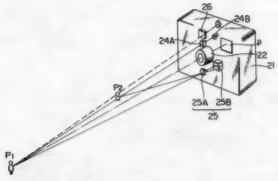
**Filed Feb. 10, 1984, Ser. No. 579,020**

**Claims priority, application Japan, Feb. 14, 1983, 58-20637[U]**

**Int. Cl.⁴ G03B *3/00***

**U.S. Cl. 354—403** **10 Claims**




1. An automatic focusing camera, comprising:

a taking lens;

distance measuring means comprising a light emitting means and a light receiving means, each of which, and the taking lens, are arranged approximately in alignment;

a protector means slidable between a first position where the taking lens and the distance measuring means are opened and a second position where the taking lens and the distance measuring means are closed.

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4,591,258

## SAFETY MEANS FOR PROCESS KIT

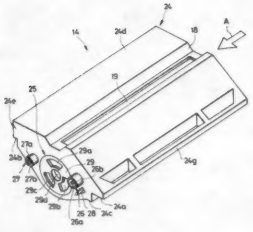
**Fumio Nishino, Tokyo; Shigeyoshi Onoda, Yokohama; Akihiro Nomura, Kawasaki; Morikazu Mizutani, Tokyo; Shinji Kanemitsu, Ichikawa, and Mototada Toriumi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 16, 1982, Ser. No. 450,210**

**Claims priority, application Japan, Dec. 22, 1981, 56-208489; Mar. 5, 1982, 57-35626; May 14, 1982, 57-81763; May 17, 1982, 57-82649**

**Int. Cl.⁴ G03G *15/00***

**U.S. Cl. 355—3 R** **9 Claims**




1. A process unit mountable into and demountable from a main assembly, comprising:

an image bearing member;

process means actable on and disposed around said image bearing member;

a casing for integrally supporting said image bearing member and said process means;

a member, exposed at the outside of said casing, for receiving a driving force from the main assembly when said unit is mounted in said assembly; and

a projecting member provided adjacent said driving force receiving member, said projecting member being exposed outside of and projected beyond said driving force receiving member, wherein said projecting member protects said driving force receiving member from contact with a support surface when said process unit is removed from said main assembly.

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4,591,259

## TRI-PASS BAFFLE DECURLER

**Youti Kuo, Penfield, and Dale W. Young, North Chili, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 1, 1985, Ser. No. 718,606**

**Int. Cl.⁴ G03G *15/00***

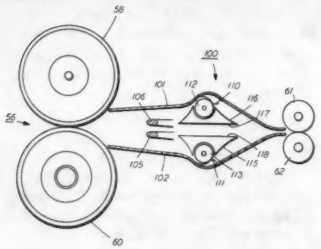
**U.S. Cl. 355—3 SH** **8 Claims**

1. An apparatus for decurling sheet material, including:

first and second guide baffles for receiving sheets to be decurled;

first and second partition baffle means positioned within said first and second guide baffles and adapted to direct sheets received by said first and second baffles into one of three paths depending on the amount and direction of curl in the sheets; and

spring loaded bending baffle means positioned within said first and second guide baffle means and adapted to work in



conjunction with idler roll means to reverse bend sheets directed thereto by said partition baffle means.

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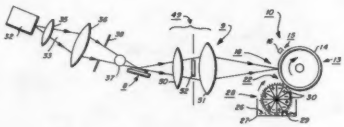
**4,591,260**

## IMAGING SYSTEM UTILIZING AN ELECTRO-OPTIC DEVICE

**Kwok-leung Yip, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Sep. 4, 1984, Ser. No. 647,285**
**Int. Cl.[4] G03G *15/00***
**U.S. Cl. 355—3 R** **4 Claims**



**1.** In combination:

(a) means providing a sheet-like beam of high intensity electromagnetic radiation for exposing a photoreceptor in a xerographic system a line at a time,

(b) means for modulating said beam simultaneously across said line in accordance with an image signal input whereby to provide successive lines of image pixels for exposing said photoreceptor and creating a latent electrostatic image on said photoreceptor, said modulating means including

(1) an array of individually actuated light valves disposed across and at substantially right angles to the axis of said beam, said array of light valves effectively subdividing said beam into a succession of individual rays, there being at least one light valve for each image pixel comprising said line, and;

(2) a beam stop;

said light valves being individually actuatable in accordance with said image signal input so that the light ray associated with each of said light valves is impinged selectively on one of said photoreceptor and beam stop; and

(c) means to develop said image including

(1) a source of uncharged toner, and

(2) means to bring said toner into operative relation with said image;

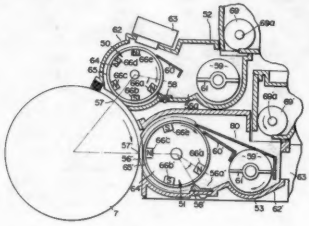
simultaneous actuation of plural adjoining ones of said electrodes in accordance with an image signal input representing a solid image area generating plural side by side rays which through destructive interference with one another form a non-uniform image charge pattern representing said solid image area on said photoreceptor and enable said uncharged toner to fully develop said solid image area.

**4,591,261**

## IMAGE FORMING APPARATUS WITH VARIABLE ROTATIONAL SPEED OF DEVELOPERS

**Ryoji Saruwatari, and Yoshiharu Taniyama, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Apr. 25, 1985, Ser. No. 727,000**
**Claims priority, application Japan, Apr. 27, 1984, 59-85621**
**Int. Cl.[4] G03G *15/01, 15/08***
**U.S. Cl. 355—4** **14 Claims**



**1.** An image forming apparatus comprising:

an image carrier movable in one direction and carrying thereon a latent image responsive to an original image;

first developing means rotatably disposed opposite the surface of the image carrier, carrying a first developing agent thereon, and adapted to supply the first developing agent to the image carrier while rotating, thereby developing the latent image by means of the first developing agent;

second developing means rotatably disposed opposite the surface of the image carrier and adjacent to the first developing means, carrying a second developing agent thereon, and adapted to supply the second developing agent to the image carrier while rotating, thereby developing the latent image by means of the second developing agent; and

drive means for moving the image carrier in said one direction and selectively rotating the first and second developing means, said drive means being adapted to move the image carrier relatively to the first developing means at a first relative speed when the first developing means is rotated and to move the image carrier relatively to the second developing means at a second relative speed different from the first relative speed when the second developing means is rotated.

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**4,591,262**

## ELECTROSTATIC COPYING APPARATUS

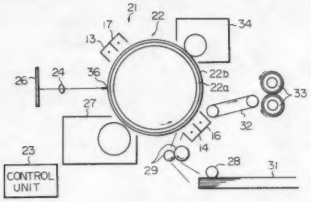
**Seiichi Oseto; Itaru Fujimura, and Hitoshi Nakamura, all of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Sep. 17, 1979, Ser. No. 75,790**
**Claims priority, application Japan, Sep. 22, 1978, 53-116921**
**Int. Cl.[4] G03G *15/02***
**U.S. Cl. 355—14 CH** **7 Claims**

**1.** An electrostatic copying apparatus including a rotary photoconductive member, primary charging means and secondary charging means operatively disposed adjacent to the photoconductive member, the secondary charging means being disposed downstream of the primary charging means in a direction of movement of the photoconductive member, characterized by comprising:

control means for, at a beginning of a copying operation, energizing the secondary charging means and subsequently energizing the primary charging means after a predetermined length of time has elapsed which is greater

than a period of time required for a leading edge of a portion of the photoconductive member charged by the




secondary charging means to reach the primary charging means.

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**4,591,263**

## PHOTOGRAPHIC ROLLER COPYING DEVICE

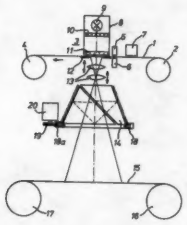
**Berthold Fergg, Taufkirchen, Fed. Rep. of Germany, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Mar. 18, 1985, Ser. No. 713,270**

**Claims priority, application Fed. Rep. of Germany, Apr. 4, 1984, 3412693**

**Int. Cl.⁴ G03B** *27/52, 27/70*

**U.S. Cl. 355—43** **7 Claims**



1. A photographic roller copying device for projecting of originals having different side lengths on a band-shaped copying material with a band width corresponding to a desired copy dimension, wherein the originals are arranged in a band form and have different formats arranged along and transverse to the longitudinal direction of the band, the photographic roller copying device comprising a projecting objective with an adjustable projecting scale allowing a copying size of both original formats; and a turning prism located in a beam course and turnable between a first angular position in which it turns the image of the original by 90° and a second angular position in which it turns the image of the original by 0° or 180°.

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**4,591,264**

## AUTO EXPOSURE CONTROL DEVICE FOR READER-PRINTER

**Nobuo Ueda, Sagamihara, and Masafumi Fujita, Kawasaki, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Jan. 29, 1985, Ser. No. 696,218**

**Claims priority, application Japan, Jan. 31, 1984, 59-17409; Jan. 31, 1984, 59-17410**

**Int. Cl.⁴ G03B** *27/80, 27/74*

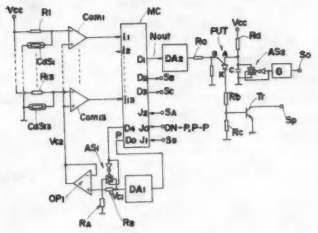
**U.S. Cl. 355—68** **10 Claims**

1. An automatic exposure control device for use in a reader-printer duplicating from negative and positive films, comprising:

a plurality of photodetectors arranged in an optical path projecting an image of a microfilm;

a plurality of comparators having first inputs connected with respective photodetectors;

means for supplying a stepwise varying comparison voltage to a second input terminal of each comparator; control means responsive to the outputs of said comparators for determining the amount of exposure from maximum and-/or minimum quantity of light detected by said photodetectors; and



means for changing the amount of variation per step of the comparison voltage in accordance with a change of the type of film to the positive or to the negative, whereby the available number of steps for the comparison voltage is of approximately the same level for the positive and negative films.

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**4,591,265**

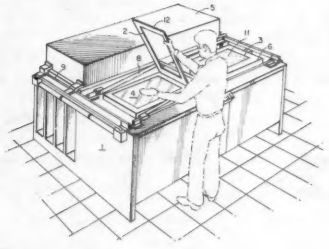
## SYSTEM FOR CONTACT PRINTING WITH LIQUID PHOTOPOLYMERS

**Donald F. Sullivan, 115 Cambridge Rd., King of Prussia, Pa. 19406**

**Continuation-in-part of Ser. No. 364,309, Apr. 1, 1982, Pat. No. 4,506,004, and a continuation-in-part of Ser. No. 600,084, Apr. 13, 1984. This application Oct. 24, 1984, Ser. No. 664,431**

**Int. Cl.⁴ G03B** *27/30*

**U.S. Cl. 355—100** **21 Claims**



1. A system for reproduction of photopatterned images on liquid photopolymer films placed as a layer on at least one surface of a planar substrate for photoexposure through a pattern carried upon a reusable image bearing phototool having an image bearing surface, comprising in combination, a console having a radiation source for photoexposing the liquid photopolymer layer to change its solubility characteristics for permitting development of a pattern therein by selectively washing out a soluble portion thereof, means for registering the substrate and phototool surfaces adjacent to each other on said console with a single layer of photopolymer sandwiched therebetween and in contact with the respective surfaces thereof, and means for positioning the single photopolymer layer in surface contact with the image bearing surface of the phototool to receive radiation from the radiation source for

photopatterning the image pattern by contact printing on the liquid polymer layer through the phototool.

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**4,591,266**

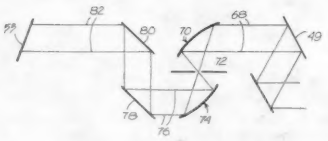
## PARABOLIC FOCUSING APPARATUS FOR OPTICAL SPECTROSCOPY

**Walter M. Doyle, Laguna Beach, Calif., assignor to Laser Precision Corporation, Utica, N.Y.**

**Continuation of Ser. No. 291,402, Aug. 10, 1981, abandoned. This application Feb. 14, 1984, Ser. No. 580,120**

**Int. Cl.[4] G01J** *3/45;* **G01N** *21/01*

**U.S. Cl. 356—244** **5 Claims**




1. For use with a spectrometer having a collimated radiation beam approaching a sample and a collimated radiation beam leaving the sample, an optical accessory, of the type in which radiation is passed through a sample holder element which provides a confined path therethrough, comprising:

a first paraboloid reflector which reflects the approaching collimated beam in such a way as to focus the radiation at one end of the confined radiation path through the sample holder;

a second paraboloid reflector which receives radiation from a focus at the other end of the radiation path through the sample holder and which reflects the radiation to provide the collimated beam leaving the sample; and

means for allowing constrained adjustment movement of at least one of the paraboloid reflectors relative to the other paraboloid reflector in order to adjust for differences in the length and/or orientation of the sample holder element, such means including (a) means for allowing such movement of at least one of the paraboloid reflectors along a path parallel to the axis of its incident collimated beam, and (b) means for allowing such movement of at least one of the paraboloid reflectors along a path perpendicular to the axis of its incident collimated beam.

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**4,591,267**

## SPECTROMETER

**Donald R. Demers, Nashua, N.H., and Charly D. Allemand, Newton, Mass., assignors to Baird Corporation, Bedford, Mass.**

**Division of Ser. No. 537,177, Sep. 29, 1983, which is a division of Ser. No. 254,929, Apr. 16, 1981, Pat. No. 4,432,644. This application Jan. 16, 1985, Ser. No. 691,834**

**The portion of the term of this patent subsequent to Nov. 17, 1998, has been disclaimed.**

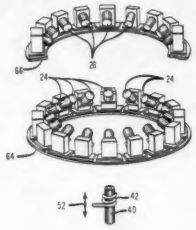
**Int. Cl.[4] G01J** *3/443;* **G01N** *21/64, 21/73*

**U.S. Cl. 356—316** **3 Claims**

1. A fluorescence spectrometer for multielement analysis of samples comprising:

(a) a source for atomizing a dispersed sample along an axis;

(b) a plurality of pairs of energizers and detectors mounted about said source, with each of said pairs for determining one of said elements;




(c) said energizers and said detectors being each mounted on a carousel.

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**4,591,268**

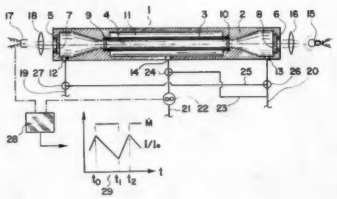
## ACCUMULATIVE ABSORPTION-DISPERSION SPECTROPHOTOMETER

**Hyok S. Lew, 7890 Oak St., Arvada, Colo. 80005**

**Filed Nov. 23, 1984, Ser. No. 674,499**

**Int. Cl.[4] G01N** *21/00*

**U.S. Cl. 356—338** **11 Claims**




1. A device for measuring the concentration of chemical substances dissolved or suspended in a medium comprising in combination:

(a) a cell for holding said medium with dissolved or suspended substances, wall of said cell including at least in part a filter blocking the movement of said substances while allowing the movement of said medium thereacross, said cell including window arrangement allowing a beam of a radiant energy to enter said cell, pass by said filter in a close proximity and leave said cell;

(b) a source of said beam of a radiant energy disposed exteriorly to said cell;

(c) a sensor receiving and measuring the intensity of said beam of a radiant energy leaving said cell after passing through a mass concentration boundary layer formed adjacent to said filter, said sensor disposed exteriorly to said cell;

(d) means for continuously supplying said medium to said cell and for continuously removing said medium leaving said cell through said filter wherein said filter creates said mass concentration boundary layer adjacent to said cell-side surface of said filter during a measuring period;

(e) means for washing off said mass concentration boundary layer adjacent to said cell-side surface of said filter during a washing period; and

(f) means for measuring the amount of flow of said medium across said filter; wherein said sensor measures the increase of the concentration of said substances in said mass concentration boundary layer during a measuring period following a washing period and said means for measuring the amount of flow measures the flow of said medium

causing said increase of the concentration of said substances in said mass concentration boundary layer; whereby, the concentration of said substances in said medium is obtained.

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**4,591,269**

## ROTATION RATE MEASURING INSTRUMENT

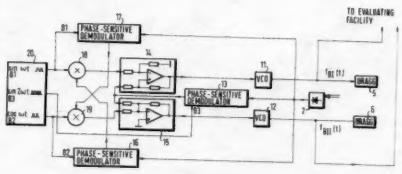
**Friedemann Mohr, Renningen, Fed. Rep. of Germany, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Nov. 29, 1983, Ser. No. 555,905**

**Claims priority, application Fed. Rep. of Germany, Dec. 3, 1982, 3244713**

**Int. Cl.⁴ G01B *9/02*; G01C *19/64***

**U.S. Cl. 356—350** **11 Claims**




1. Rotation rate measuring instrument comprising a device producing a light beam which is split into two component beams ($I_{CW}$, $I_{CCW}$) which travel over a closed light path in opposite directions, wherein, after the component beams have traversed the light path, a phase difference ($\phi_S$) caused by the Sagnace effect and proportional to rotation rate ($\Omega$) exists between them, wherein the two component beams having traversed the light path are combined and directed to an optical-to-electrical-transducer (2) followed by a control and evaluating facility, wherein at least one modulator (5, 6) is provided which modulates at least one of the component beams in such a way that, after the two component beams have traversed the light path, periodically varying phase differences exist between them which are chosen so that the output signal of the optical-to-electrical transducer (2) has the same amplitudes at the varying phase differences when the measuring instrument is at rest, and wherein the drive signal for the modulator is so controlled that the output signal of the optical-to-electrical transducer has a constant amplitude even in the presence of rotation, characterized by means for so varying the drive signal for the modulator (5) as to periodically produce during each cycle a succession of phase differences $(2\nu+1)\pi/2$, $(2\nu+3)\pi/2$, $(2\nu+5)\pi/2$, and $(2\nu+3)\pi/2$ between the component beams, where $\nu$ is an arbitrary positive or negative integer, and that the drive signal exhibits changes in frequency by 2F, and means for determining the rotation rate $\Omega$ from the equation

$$\Omega = \frac{\lambda C}{8RL} \quad \frac{(2\nu + 1)F - \Delta f}{F}$$

or from an equation derivable therefrom, where $\lambda$=vacuum wavelength of light, C=velocity of light in vacuo, R=radius of the coiled light path, L=length of the light path, and f=drive signal frequency shift required to compensate for the Sagnac phase difference $\Phi_S$.

**4,591,270**

## DISPERSIVE OPTICAL DEVICE

**Hans O. S. Ahlén, Sollentuna, Sweden, assignor to Institutet för Optisk Forskning, Stockholm, Sweden**

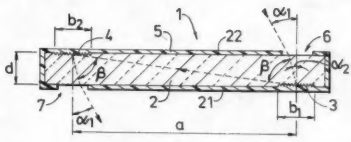
**PCT No. PCT/SE81/00101, § 371 Date Jan. 26, 1982, § 102(e) Date Jan. 26, 1982, PCT Pub. No. WO81/03552, PCT Pub. Date Dec. 10, 1981**

**PCT Filed Mar. 30, 1981, Ser. No. 346,044**

**Claims priority, application Sweden, May 28, 1980, 8003968**

**Int. Cl.⁴ G01J *3/18***

**U.S. Cl. 356—333** **16 Claims**




3. A dispersive optical device for use as a basic element for wave length separation in a monochromator, a spectroscope or the like, comprising a first and second reflection or transmission grating so arranged on a common substrate that their planes and their grating rules are parallel to each other, the mutual arrangement of the two gratings being such that the light diffracted by the first grating passes through said substrate before striking the second grating and diffracted thereby, said first grating having a diffraction angle of at least 60° and the second grating having an angle of incidence of at least 60°, wherein the angle between a normal to the first grating and a light path between the centers of the gratings is in the range of 70°–88°, and a light absorbent coating, the refractive index of which is close to that substrate, is applied to the optical device, except at the surface portion of the substrate facing away from the gratings.

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**4,591,271**

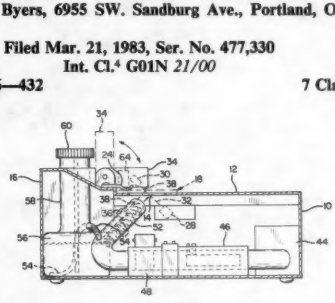
## METHOD AND APPARATUS FOR COATING DETECTION AND SURFACE EVALUATION

**Donald W. Byers, 6955 SW. Sandburg Ave., Portland, Oreg. 97223**

**Filed Mar. 21, 1983, Ser. No. 477,330**

**Int. Cl.⁴ G01N *21/00***

**U.S. Cl. 356—432** **7 Claims**




1. The method of determining the characteristics of a surface of a piece of material which comprises:

(a) establishing the temperature of the piece at a temperature level below the condensation temperature of a selected condensable vapor,

(b) impinging a puff of the vapor against said surface for a time duration sufficient to cause a predetermined condensation of the vapor thereon,

(c) directing a primary beam of light against a surface of the piece under conditions predetermined to generate a secondary beam of light, the secondary beam being either transmitted or reflected, depending upon whether the piece is transparent, translucent or opaque to the primary beam,

(d) receiving the secondary beam by light-measuring means,

(e) measuring the intensity of the secondary beam,
(f) repeating the foregoing sequence with reference to a second surface of the piece, and
(g) by comparing the intensities of the two secondary beams determining the characteristics of the respective piece surfaces.

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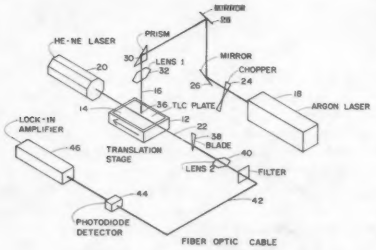
**4,591,272**

## PHOTOTHERMAL DEFLECTION DENSITOMETER FOR THIN LAYER CHROMATOGRAPHY

**Michael D. Morris, and Tsuey I. Chen, both of Ann Arbor, Mich., assignors to Board of Regents acting on behalf of University of Michigan, Ann Arbor, Mich.**

**Filed Dec. 27, 1983, Ser. No. 565,349**
**Int. Cl.[4] G01J *3/42*; G01N *21/41***
**U.S. Cl. 356—432** **7 Claims**




1. A photothermal deflection method for quantitative analysis of compounds separated on a thin layer chromatogram comprising the steps of:
(a) impinging a first laser beam on a thin layer chromatographic plate containing a sample resolved into separate compounds such that said compounds selectively absorb said impinging laser light and heat the gas phase directly above the point of laser impingement;
(b) probing the gas phase directly above said point at which said first laser beam impinges on said thin layer chromatographic plate with a second laser beam, wherein said second probing laser beam is essentially parallel to said plate;
(c) sensing and recording the deflection of said second probing laser beam caused by the heating of said gas phase at said point of impingement thus establishing the absorbance of the separated compound at said point of laser impingement;
(d) shifting the point at which said first laser impinges on said chromatographic plate; and
(e) repeating the above steps (a) through (d) thus determining the absorbance of the resolved separate compounds of said sample as a function of their respective positions on said thin layer chromatographic plate.

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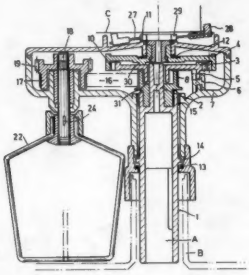
**4,591,273**

## WHISK BEATER

**Jean Meyer, 8 rue des Fossettes, F 14128 Cormelles le Royal, and Manuel A. Gallardo, 11 rue du Temple, 77500 Chelles, both of France**

**PCT No. PCT/FR83/00112, § 371 Date Feb. 8, 1984, § 102(e) Date Feb. 8, 1984, PCT Pub. No. WO83/04368, PCT Pub. Date Dec. 22, 1983**
**PCT Filed Jun. 8, 1983, Ser. No. 589,119**
**Claims priority, application France, Jun. 9, 1982, 82 10008**
**Int. Cl.[4] B01F *7/30***
**U.S. Cl. 366—288** **3 Claims**

1. A beater comprising a whisk assembly, a bowl, a lid for closing the bowl, a shell mounting said whisk assembly therein and which is in turn mounted for rotation inside the bowl, a drive shaft, a mechanical link between said drive shaft and the shell, the whisk assembly being driven by the shaft, characterized in that a resilient member is disposed between the shell and the mechanical link, and including a sealing ring and a seat for creating a seal between said drive shaft and said shell, said resilient member being compressed by pressure from the lid



closing said bowl and causing downward translation of the shell, which causes movement of the sealing ring away from its seat, and an unlocking of the lid causing the seat to be pressed against the sealing ring.

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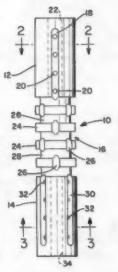
**4,591,274**

## MIXING NOZZLE FOR INJECTION MOLDING

**George Sulin, 16704 Woodbury Ave., Cleveland, Ohio 44135**

**Filed Oct. 25, 1984, Ser. No. 664,610**
**Int. Cl.[4] B01F *5/00***
**U.S. Cl. 366—336** **13 Claims**



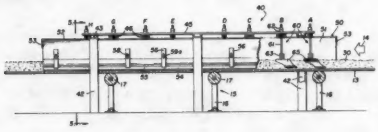
1. A mixing nozzle assembly for injection molding, comprising:
a casing having a first bore therein;
a mixing member received in said first bore, said mixing member and first bore being of substantially the same, diameter, said mixing member having first and second end portions, each end portion with an axial bore therein communicating with an associated plurality of radially extending holes, said first and second end portions each having a plurality of longitudinally extending grooves in communication with said center section, said radially extending holes passing through said grooves; and
an imperforate solid center section interconnecting said first and second end portions, said center section characterized by a plurality of interconnected passages extending between said first and second end portions.

**4,591,275**

## APPARATUS FOR MIXING PULVERULENT MATERIAL ON A CONVEYOR BELT

**Donald R. Garthus, Crete, Ill., assignor to Interlake, Inc., Oak Brook, Ill.**

**Filed Jun. 15, 1984, Ser. No. 620,907**
**Int. Cl.[4] B01F** *13/00*
**U.S. Cl. 366—349** **18 Claims**



1. Mixing apparatus for mixing pulverulent or other bulk material while is it conveyed in a continuous stream on a belt conveyor, wherein the stream is made up of a plurality of substreams of different compositions, said mixing apparatus comprising: plow means supported adjacent to and extending into the stream of material on the conveyor belt, said plow means including a plurality of fixed curved blades spaced apart both laterally and longitudinally of the conveyor belt, means immovably mounting each of said blades with respect to the conveyor belt in a mixing position arranged to engage the stream on both sides of said blade and lift and displace a portion of the stream both transversely and laterally relative to the conveyor belt for commingling adjacent substreams, at least certain ones of said blades being disposed for displacing the engaged portions of the stream laterally toward the center of the conveyor belt, thereby to mix together the compositions of the substreams.

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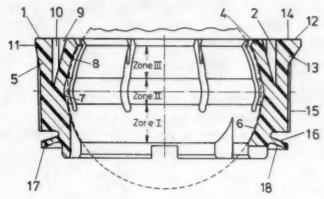
**4,591,276**

## RADIAL BALL-AND-SOCKET BEARING

**Karl-Heinz Schneider, Schwalbach-Elm; Otto Paeschke, Puettlingen; Michael Del Fabro, Puettlingen, and Norbert Loeser, Puettlingen, all of Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany**

**Filed Jan. 9, 1985, Ser. No. 689,884**
**Claims priority, application Fed. Rep. of Germany, Jan. 14, 1984, 8400958[U]**
**Int. Cl.[4] F16C** *23/00, 11/06*
**U.S. Cl. 384—206** **10 Claims**

1. In a ball-and-socket bearing comprising an outer ring having a bore for receiving a ball-shaped element, an axis, a front surface defining an end for receiving said ball-shaped element, and a recess extending axially from said front surface, the improvement wherein said outer ring further comprises a plurality of axially directed slots extending radially therethrough at said end, said slots and said recess forming adjacent radially inner and radially outer tongues, each of said inner tongues having a surface which radially faces a corresponding surface on the respective radially adjacent outer tongue, at least one of said confronting tongue surfaces being provided with one or more ribs, whereby said ribs are separated from the confronting tongue surface by a gap when said bearing is




unassembled and said ribs engage said confronting tongue surface when said bearing is assembled.

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**4,591,277**

**Patent Not Issued For This Number**

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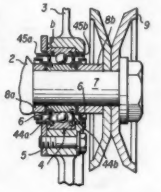
**4,591,278**

## WATERPROOF BALL BEARING DEVICE

**Yoshiyuki Iwaki, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 27, 1984, Ser. No. 635,271**
**Claims priority, application Japan, Jul. 30, 1983, 58-119042; Jul. 30, 1983, 58-119043**
**Int. Cl.[4] F16C** *13/02;* **F16J** *15/16*
**U.S. Cl. 384—480** **2 Claims**




1. A waterproof ball bearing assembly comprising:
(a) a rotary shaft;
(b) a ball bearing mounted on said rotary shaft, said ball bearing comprising:
(i) an inner ring surrounding said rotary shaft;
(ii) an outer ring surrounding said inner ring; and
(iii) a plurality of balls held between said inner ring and said outer ring;
(c) a first spacer mounted on said rotary shaft adjacent to said ball bearing on a first side thereof;
(d) a first flexible waterproof seal mounted on said ball bearing on the first side of said ball bearing, said first flexible waterproof seal comprising:
(i) an annular plate-like portion the radially outer edge of which is connected sealingly to said outer ring of said ball bearing and the radially inner edge of which is adjacent to or in resilient contact with said inner ring of said ball bearing and

(ii) a first annular projecting portion extending axially from said annular plate-like portion radially outwardly of said first spacer; and

(e) a first metallic sleeve seal mounted between said first spacer and said inner ring of said ball bearing, said first metallic sleeve seal comprising:

(i) an annular plate-like portion which is in axially abutting contact with adjacent surfaces of said first spacer and said inner ring of said ball bearing;

(ii) a first annular projecting portion extending axially from said annular plate-like portion radially outwardly of said first spacer and radially inwardly of said annular projecting portion of said first flexible waterproof seal;

(iii) an annular collar portion extending radially outwardly from the end of said first annular projecting portion remote from said annular plate-like portion of said first metallic sleeve seal; and

(iv) a second annular projecting portion extending axially from said annular collar portion radially outwardly of said first annular projecting portion and radially inwardly of, but closely spaced from, said annular projecting portion of said first flexible waterproof seal.

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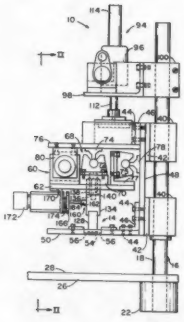
**4,591,279**

## MARKING MACHINE FOR FORMING VARIABLE SIZED CHARACTERS

**Edwin W. Speicher, Pittsburgh, Pa., assignor to M. E. Cunningham Company, Ingomar, Pa.**

**Filed Aug. 17, 1984, Ser. No. 642,129**
**Int. Cl.[4] B41J *3/10***
**U.S. Cl. 400—121** **9 Claims**



1. Apparatus for marking an object comprising,

a fixed member having a horizontal surface for supporting an object to be marked,

a generally U-shaped support member for supporting a marking device, said support member having an intermediate plate portion, a base plate portion, and a support plate portion, said base plate portion and said support plate portion extending from said intermediate plate portion in generally parallel spaced relation to each other,

said marking device having a longitudinal axis,

guide means secured to said support member between said base plate portion and said support plate portion, said guide means supporting said marking device for linear movement relative to said support member and having a longitudinal axis,

drive means for moving said marking device linearly relative to said fixed member to apply a mark on an object positioned on said fixed member horizontal surface,

means for fixedly mounting said U-shaped support member adjacent to said fixed member with said base plate in a position either parallel to or perpendicular to said fixed member horizontal surface so that said marking device is arranged to mark either a vertical surface or a horizontal surface of said object, and

indexing means to pivot said marking device relative to said guide means to provide a preselected angle between said guide means longitudinal axis and said marking device longitudinal axis and thereby provide characters of a preselected size inscribed by said marking device on said object.

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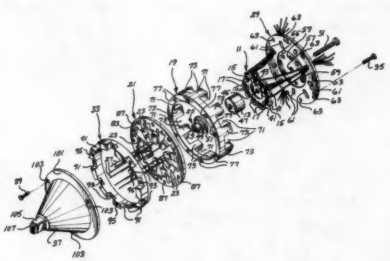
**4,591,280**

## PERMANENT MAGNET, STORED ENERGY, PRINT HEAD

**Edward D. Bringhurst, Seattle, Wash., assignor to Mannesmann Tally Corporation, Kent, Wash.**

**Filed Jan. 22, 1985, Ser. No. 693,581**
**Int. Cl.[4] B41J *3/12***
**U.S. Cl. 400—124** **25 Claims**



1. A print head for a serial dot matrix printer comprising:

a base plate formed of a ferromagnetic matrial and including a center region and a plurality of outwardly extending arms;

a high energy permanent magnet mounted in the center of said base plate such that the magnetic lines of flux produced by said magnet lie generally orthogonal to said base plate;

a plurality of electromagnetic elements, one of said plurality of electromagnetic elements being mounted on the outer end of each of said arms of said base plate on the same face of said base plate as said high energy permanent magnet so as to surround said high energy permanent magnet;

a hammer support surrounding said plurlity of electromagnetic elements and said high energy permanent magnet, said hammer support including a support plate and an apertured spacer ring, said base plate being mounted in a central location on said support plate and said apertured spacer ring mounted on said support plate so as to surround said base plate, said plurality of electromagnetic elements and said high energy permanent magnet;

a plurality of hammers, equal in number to the number of electromagnetic elements, mounted on said hammer sup-

port, said plurality of hammers being planar and formed of a resilient, magnetically permeable material, said plurality of hammers being mounted such that a hammer is aligned with each electromagnetic element and said high energy permanent magnet and forms a magnetic flux path between said high energy permanent magnet and its associated electromagnetic element, said hammers being positioned such that each hammer is drawn from an unstressed planar state into stressed cocked state by said high energy permanent magnet pulling hammers toward their associated electromagnetic elements, said pulling action occurring in the absence of the application of electric power to said electromagnetic elements; and,

a plurality of dot printing elements equal in number to said number of hammers, one of said dot printing elements positioned so as to be moved into a print position by each of said hammers when electric power is applied to the electromagnetic element associated with the hammer.

7. In a printer wherein flat, generally planar hammers having a fixed end and a movable end are drawn from an unstressed position into a stressed cocked position by a pulling magnetic force that is counteracted by another magnetic force to release the hammers, the improvement comprising: a stepped pole aligned with the fixed end of said hammers, said stepped pole including a step region defined by a step lying parallel to said hammers and a riser lying orthogonal to said hammers, the tips of said hammers lying in said step region when said hammers are in said stressed cocked position resulting in the magnetic flux between said hammers and said stepped pole being split, part of said flux flowing between said hammers and said step and part of said flux flowing between said hammers and said riser.

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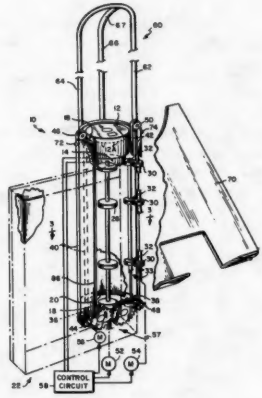
**4,591,281**

## SHEET-FEED MECHANISM FOR ROTARY PRINT HEAD

**Robert Howard, New York, N.Y.; Richard R. Helinski, Hudson, N.H.; John R. Larsen, Hampstead, N.H., and Herbert E. Menhennett, Windham, N.H., assignors to Howtek, Inc., Hudson, N.H.**

**Filed Nov. 8, 1984, Ser. No. 669,671**
**Int. Cl.[4] B41J *3/02***
**U.S. Cl. 400—126** **23 Claims**




1. A sheet-feed mechanism for feeding paper past a rotary print head, the sheet-feed mechanism comprising:

A. a paper track disposed adjacent the print head and defining a paper path, in the shape of a partial circular annulus coaxial with the rotational axis of the rotary print head, along which paper located in the track can be moved axially past the print head for printing, the paper track having an axially extending lateral opening through which paper can be fed laterally into the paper path before being moved axially along it, the paper track also having an exit opening at one end of the paper track through which paper sheets leave the paper track axially; and

B. a feeder mechanism including a movable feeder tab, the feeder mechanism being operable to position the feeder tab in the paper path and move it axially along the paper path for moving a sheet therewith.

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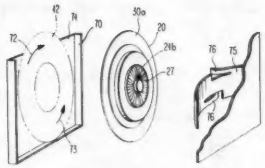
**4,591,282**

## DRIVE MECHANISM FOR A RIBBON DISC

**John P. Bradley, Versailles, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 29, 1984, Ser. No. 626,078**
**Int. Cl.[4] B41J *31/00***
**U.S. Cl. 400—144.2** **4 Claims**



1. A drive for a ribbon disc on an impact printer, said printer including a printwheel mounted for rotation intermediate a print hammer and print receiving means; drive means connected to said printwheel for effecting rotation thereto to position selected petals of said printwheel opposite the hammer; a ribbon disc intermediate said printwheel and said print receiving means and mounted for rotation in a cartridge in frictional engagement with said printwheel, clutch means for coupling and uncoupling said ribbon disc to and from said drive means dependent upon rotation in one or the other of a first or second direction, said clutch means including means rigidly mounted on said cartridge to engage said ribbon disc and inhibit rotation thereof when said printwheel is rotated in said first direction by said drive means; said means on said cartridge permitting rotation of said ribbon disc when rotation of said printwheel is in said second direction, which is opposite to said first direction.

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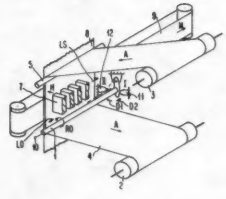
**4,591,283**

## RIBBON CORRECTION UNIT FOR PRINTERS

**Fritz Hilpert, Oesterreich, Fed. Rep. of Germany, assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 28, 1985, Ser. No. 695,602**
**Claims priority, application European Pat. Off., Feb. 22, 1984, 0841018369**
**Int. Cl.[4] B41J *35/04***
**U.S. Cl. 400—248** **4 Claims**



1. A ribbon correction unit for impact printers with type carriers revolving transversely to the direction of ribbon ad-

vance, comprising a wind-up and wind-off roll for a ribbon, characterized in that the ribbon is guided across at least one pivotable guide roller located between sid wind-up and wind-off rolls, said guide roller being pivotable about a pivot between two stops, said pivotable guide roller being arranged such that its axis extends roughly parallel to the direction of revolution of the type carrier and its free pivotable end points in the direction of said transverse revolution of said type carrier, said pivotable guide roller by contact with the ribbon is pivoted in the direction of ribbon advance up to said stops, said pivotable guide roller being freely rotatable as a result of contacting said moving ribbon, and means for preventing or allowing the free rotation of said guide roller while in contact with said moving ribbon, said means being selectively operable during printing for compensating for a lateral displacement of the ribbon, occurring during printing in the direction of revolution of the type cartrier, for allowing rotation of said pivotable guide roller whereby said guide roller exerts a force component on the ribbon counteracting said lateral displacement.

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**4,591,284**

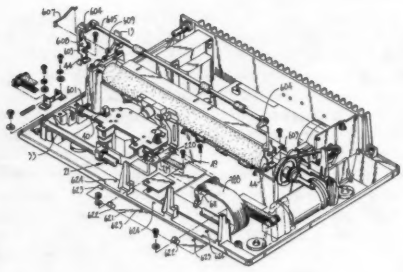
## DAISYWHEEL PRINTER WITH IMPROVED MOUNTING FOR MECHANICAL ELEMENTS

**Sam K. Lim, San Jose; Daniel D. Fong, Oakland, and Eugene A. Stoner, Pleasanton, all of Calif., assignors to Mechatron Systems, Inc., Santa Clara, Calif.**

**Continuation of Ser. No. 538,606, Oct. 3, 1983, abandoned. This application Aug. 1, 1985, Ser. No. 762,021**

**Int. Cl.[4] B41J** *29/02, 29/00*

**U.S. Cl. 400—691** **6 Claims**



1. In a printing device having a shiftable carriage (300) provided with a printing element and movable along a pair of parallel guide rods (33, 40), a rotatable platen (70) having a pair of opposed ends and extending parallel to the path of travel of the carriage (300), a belt and pulley assembly (48, 49) including a carriage motor (57) for shifting the carriage (300) along said path of travel with the pulley (48) of said assembly (48, 49) being at one end of the assembly (48, 49) and the carriage motor (57) at the opposite end of the assembly (48, 49), a pressure roller assembly (141, 143) including a pressure roller operating arm (72) extending adjacent to and parallel with the platen (70), said pressure roller operating arm (72) having a number of spaced rocker arms (122) thereon with the rocker arms (122) having pressure rollers thereon for releasably holding a sheet against the platen (70) and being biased in one direction by a number of springs (125) engaging respective rocker arms (122), and a platen drive motor (90) having a side plate (99) and belt and pulley means (91, 92) for coupling the platen (70) with the platen drive motor (90), the improvement comprising:

a base member (21) of one-piece construction having a metallic body (21) and means integral with the body (21) for mounting the carriage (300), the platen (70), said belt and pulley assembly, said pressure roller assembly (141, 143) and said platen drive motor (90), said mounting means including:

a first pair of posts (31, 32), said body (21) having a front end, a rear end and a pair of opposed sides, said posts (31, 32) being near respective sides of the body (21) and adjacent to the front end thereof for releasable attachment to the ends of one (33) of the guide rods (33, 40),

there being a pair of guides (41) on the body (21) near respective sides thereof for releasable attachment to respective ends of the other guide rod (40),

there being a support member (50) on one side of the body (21) between the adjacent rods and the adjacent guide (41) for releasable attachment to said pulley (48) of said belt (49) and pulley assembly (48),

a support partition (65) having a cradle for releasably receiving and attachable to a portion of the carriage motor (57),

a pair of cradles (74, 75) near respective sides of the body rearwardly of the guides (41) for the other guide rod (40) of the carriage (300), said cradles (74, 75) being provided for releasable attachment to the ends of the platen (70),

a pair of notched supports (77, 78) near respective cradles (74, 75) for releasable attachment to respective ends of said pressure roller operating arm (72),

there being a guidepost (130) on the body (21) for each rocker arm (122), respectively, each guidepost (130) having a slot (131) therein for shiftably receiving and laterally stabilizing the respective rocker arm (122),

said body having a central ledge (127) thereon, said ledge (127) having a recess (126) formed therein for removably receiving the lower end of each of said rocker arm springs (125), respectively,

a support wall (101) for releasable attachment to the side of platen drive motor (90),

said body (21) having a platform (160) integral with the body (21) and rearwardly of the pressure roller operating arm (72) for supporting a circuit board,

there being a rear wall (177) coupled with the body and having means defining a heat exchanger on the body (21) at the rear end thereof, said rear wall projecting upwardly from and being integral with the platform (160),

said rear wall (177), said platform (160) and said support wall (101) providing a radiation shield for electronic components on the board placed on said platform (160),

there being means integral with said body for forming a cavity (171) in the body (21) below the platform (160) for receiving another circuit board.

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**4,591,285**

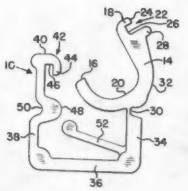
## ROD RETAINER

**John F. Nelson, New Lenox, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Oct. 15, 1985, Ser. No. 787,118**

**Int. Cl.[4] F16C** *11/00*

**U.S. Cl. 403—11** **8 Claims**



1. A one piece plastic couple for elongated members comprising:

a first member having an inner and outer surface and a distal and proximal end and whose inner surface is conformed to the shape of the transverse dimension of an elongated

member to be coupled and whose distal end includes a first latch means;

a second member having a distal and proximal end whose proximal end is affixed to a base member which extends a predetermined distance perpendicular to said second member and whose distal end is hingedly attached to the outer surface of said first member at a point intermediate said distal and proximal ends of said first member so that the inner surface of said first member faces the direction of extension of said base member;

a third member having a distal and proximal end, whose proximal end is affixed to said base and is disposed in the same direction as said second member and spaced from said second member at a predetermined distance and having a second latch means at its distal end and having a predetermiend length to permit said first and second latch means to properly engage when said said first member is pivotally moved toward said third member to a final latched position;

a spring means contained within an inner space whose boundaries are defined by the outer surface of the proximal end of said first member said second member and said base member, said spring means being designed in such a way so as to provide a force against said first member when said first member is pivotally moved in the direction of extension of said base, said force exerted by said spring means being within a range sufficient enough to eject said first member away from said base member when said first and second latch means do not properly engage without preventing proper engagement therein when sufficient force is applied to pivotally move said first member into proper latching position.

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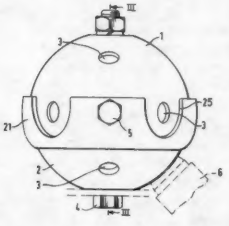
**4,591,286**

## SPACIAL STRUCTURE

**José M. J. Galan Inchaurbe, Estrada Mazustegui, 2 y 4, Bilbao, Spain**

**Filed Mar. 2, 1984, Ser. No. 585,989**
**Int. Cl.[4] F16B** *7/00*
**U.S. Cl. 403—170** **5 Claims**



1. A knuckle for a spacial structure, comprising:

a first hollow substantially spherical base piece provided with a first plurality of equidistantly positioned holes and formed with an inwardly bent perimeter lip;

a second hollow substantially peripheral base piece provided with a second plurality of equidistantly positioned holes and formed with an outwardly bent perimeter lip which faces and externally engages said inwardly bent perimeter lip so as to form a joining area of said first and second base pieces; and

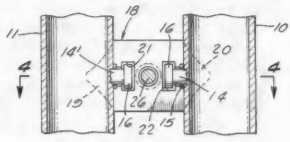
a plurality of means for joining said first and second hollow base pieces to each other so that all holes of said first and second plurality of holes are equidistantly positioned from each other, some of said joining meand connecting said first base piece at said joining area.

**4,591,287**

## MEANS FOR SECURING TUBULAR MEMBERS IN FIXED SPACED RELATION

**Gerry A. Hughes, Murfreesboro, Tenn., assignor to Samsonite Corporation, Denver, Colo.**

**Filed Aug. 20, 1984, Ser. No. 642,491**
**Int. Cl.[4] F16B** *7/08, 9/02*
**U.S. Cl. 403—237** **2 Claims**



1. A device for holding first and second generally circular cross-section tubular members in a spaced apart rigid relationship, comprising:

first and second stud means respectively welded to the first and second tubular members, each said stud means having a uniformly dimensioned shaft portion and an enlarged head at one terminus;

first and second molded synthetic plastic connector parts each having a generally semicircular cross-section and a flat surface with a cavity for receiving a stud therein, said connector parts being assembled onto the studs with the flat surfaces in contact with one another, and other surfaces on the connector parts in flush contacting relation to the outer surface of each tubular member and having a circular curve slightly less than the curve of the tubular members; and

threaded bolt and nut means securing the connector parts together.

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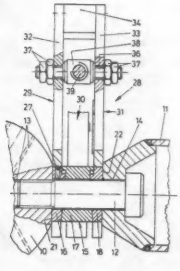
**4,591,288**

## JOINT CONNECTION FOR SPACE FRAMEWORK, MADE OF RODS AND JOINT MEMBERS

**Reinhard Schmidek, Wuerzburg, and Manfred Stark, Rimpar, both of Fed. Rep. of Germany, assignors to MERO-Raumstruktur GmbH & Co., Wurzburg, Fed. Rep. of Germany**

**Filed May 20, 1983, Ser. No. 496,547**
**Claims priority, application Fed. Rep. of Germany, May 25, 1982, 3219520**
**Int. Cl.[4] F16B** *2/14, 43/02;* **B25B** *13/46*
**U.S. Cl. 403—260** **4 Claims**



1. A joint connection for a space framework made of rods and joint members, with concentric threaded bores in the joint members to receive threaded bolts, which can be pushed in and biased with the aid of drive sleeves which are non-rotatable and axially movable, in order to connect the rods with joint members, wherein the drive sleeves are inserted between the ends of the rods and the joint members, characterized in that the drive sleeves (15) each comprise three parts, which are adjustable by the cooperation of helical surfaces (23, 24; 25, 26)

running in opposite directions on the sides of the parts facing each other, with corresponding relative axial movement in opposite directions, in order to lengthen the threaded bolts (12), and a tool to carry out the joint connection formation, characterized by three parts (29, 30, 31) which have a monkey wrench effect, to hold the drive sleeve parts to rotate relative to each other, whereby the monkey wrench-like parts (29, 31) have curved guides for a bolt (36), which has a transverse threaded bore to hold a threaded spindle (39), the curved guides for the bolt (36) having two lengthwise holes (35) in the end sections (32, 33) of the monkey wrench-like parts (29, 31), the parts (29, 31) being connected, the third monkey wrench-like part (30) being disposed between monkey wrench-like parts (29, 31), and the threaded spindle (39) being rotatably fastened to the third part (30).

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**4,591,289**

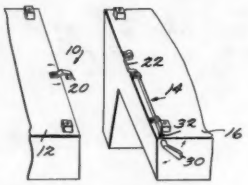
## ATTACHING DEVICE FOR MODULAR FURNITURE

**Timothy J. Vickers, Boone, and Darrell W. Lloyd, Lenoir, both of N.C., assignors to Bernhardt Industries, Lenoir, N.C.**

**Filed Aug. 17, 1983, Ser. No. 524,075**

**Int. Cl.[4] F16B *21/00*; A47C *15/00*; E05C *19/14***

**U.S. Cl. 403—322** **6 Claims**




1. A latch arrangement for latching one furniture component to another in adjacent abutting relationship comprising: a horizontal crank arm rotatable about its axis carried on the underside of one furniture component, said arm having a crank portion projecting outwardly from the rotation axis and said arm being located such that in a first rotational position of the arm the crank portion lies wholly underneath its respective furniture component and in a second rotational position of the arm the crank portion lies laterally of its respective furniture component; and an engageable hook carried by the underside of the other furniture component, means mounting said hook on said other furniture component for movement between a position concealed below said component and another position projecting laterally of said other furniture component, the arrangement being such that in moving from its second position to its first position said crank portion swings first downwardly and then upwardly thereby being capable of applying a pulling force to said hook.

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**4,591,290**

## COMBINATION ADJUSTABLE VALVE BOX ADAPTER AND REPLACEMENT FOR BROKEN VALVE BOXES

**Everett J. Prescott, Gardiner, Me., assignor to Everett J. Prescott, Inc., Gardiner, Me.**

**Continuation-in-part of Ser. No. 360,798, Mar. 22, 1982, abandoned, which is a continuation-in-part of Ser. No. 180,394, Aug. 22, 1980, abandoned. This application Aug. 29, 1983, Ser. No. 527,430**

**Int. Cl.[4] E02D *29/14***

**U.S. Cl. 404—25** **5 Claims**

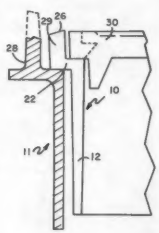
1. A valve box adaptor adapted to receive an adaptor cover to repair broken valve boxes or to raise or lower the level thereof for use in valve boxes of the type having a seat to receive a valve box cover, such valve boxes being surrounded by a valve box rim with a barrel section extending downwardly within a valve box installation, comprising:

a downwardly extending inwardly tapered elongated skirt of a width more narrow than the width of said valve box barrel;

a horizontally disposed lateral extension having inner and outer portions and having a top and a bottom positioned above said skirt with a bottom inner portion of the lateral extension being contiguous with said skirt, a top inner portion of the lateral extension forming a seat; and,

an adaptor rim formed above and contiguous with a top outer portion of the lateral extension, the top of said adaptor rim having a downwardly and outwardly extending bevel, the sides of said adaptor rim being downwardly and inwardly tapered, said adaptor rim further being smaller than the valve box rim, said adaptor receiving an adaptor cover on the seat of said adaptor, said adaptor being supported in one mode of installation upon said valve box seat with said adaptor rim being disposed within said valve box rim and with the adaptor cover being disposed on the adaptor, the lateral extension being of a height when combined with the height of the adaptor rim which is less than the original height of the valve box rim, the level of the adaptor cover relative to a valve box installation being lower than the level of the now removed valve box cover on the valve box installation, the valve box installation thereby being repaired in that situation wherein the valve box rim is broken off or otherwise reduced to a height which is lower than the original height of the valve box rim in the original valve box installation.

5. A method for adjusting the height of a covering of a valve box relative to a roadway or similar surface to accommodate a change in level of the roadway without the necessity for digging up said valve box, said valve box being of a type having a seat for receiving an original cover and being surrounded by a valve box rim with a barrel section extending downwardly, said method comprising the steps of:




determining the width of the original valve box;

providing an adaptor having a tapered downwardly extending skirt contiguous with a lateral extension having a top and bottom, the bottom of which extension is adapted to rest on the seat of the valve box, the inner top portion of said extension being adapted to form an adaptor seat for a cover smaller than the original cover of the valve box, said lateral extension extending to an outer, upwardly-extending adaptor rim having a downwardly beveled top wherein the width of the skirt of the adaptor is more narrow than the width of said barrel of said valve box and the width of said adaptor rim is more narrow than the width of the rim of said valve box;

determining the height and slope of the change in level of the roadway;

positioning said adaptor so that the top of the rim of the adaptor lies at the height and slope of the change in level of the roadway;

adjusting the level of the rim of the valve box to the height of the change in level of the valve box, including the step of breaking away at least portions of the top of the rim to the height of the change of level of the valve box, thereby to lower the height of the valve box;

providing the lateral extension of the adaptor with a vertical

thickness which causes the height of the adaptor rim and the relatively smaller cover disposed on the adaptor seat to be at a predetermined height; and,

paving said roadway up to the level of the adaptor rim.

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**4,591,291**

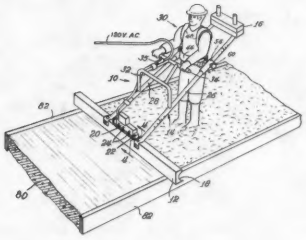
**USER-MOUNTED CONCRETE SCREED**

**Joe M. Owens, 842 Lake Holiday Dr., Sandwich, Ill. 60548**

**Filed Jan. 11, 1985, Ser. No. 690,733**

**Int. Cl.[4] E01C *19/22***

**U.S. Cl. 404—118** **16 Claims**



1. A portable screed for working concrete as the screed is moved across the concrete, the screed being configured to be mounted on and piloted by a human being, comprising

a. a screed plate for working concrete,

b. means to impart vibrations to the screed plate for tamping and leveling the concrete,

c. an elongated frame connected to one end to said screed plate,

d. a body harness,

e. means connecting said harness to said frame intermediate the ends thereof, and

f. balancing means connected to said frame for positioning the center of gravity of said screed at the vicinity of the connection of said harness to said frame, said balancing means including a weight attached to said frame adjacent the end thereof opposite to said screed plate such that said weight counterbalances said screed to thereby so position said center of gravity.

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**4,591,292**

**SUBSEA PULL-IN TOOL**

**James W. Stevens, Houston, and William H. Petersen, Kingwood, both of Tex., assignors to Shell Offshore Inc., Houston, Tex.**

**Filed May 25, 1984, Ser. No. 614,426**

**Int. Cl.[4] F16L *1/04*; E21B *43/01***

**U.S. Cl. 405—169** **6 Claims**

1. Method for connecting a flowline to a subsea structure, said method comprising;

deploying a flowline connection tool to the subsea structure,

landing and securing the flowline connection tool to the subsea structure,

activating a pull cable prime mover means carried by the flowline connection tool, thereby

pulling a flowline terminal head, the terminal head being connected to the flowline, to the flowline connection tool,

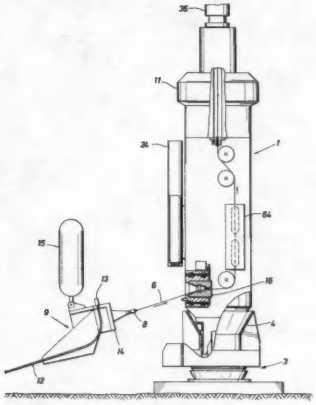
securing a bullnosed carrier of the flowline terminal head to the flowline connection tool by pulling the bullnose of the bullnosed carrier into a rotatable receptacle of the flowline connection tool,

engaging an alignment pin carried by the rotatable receptacle with a bullnosed carrier surface having an opening for said pin, by rotating the rotatable receptacle until said pin aligns with said opening which thereafter causes simultaneous movement of the bullnosed carrier and rotatable receptacle,

rotating the bullnosed carrier and with it the flowline terminal head until the connector hub of the flowline terminal head is placed in a substantially vertical position,

inserting the retainer pin carried by the flowline connection tool into the flowline terminal head, thereby,

contacting an upper element of said pin with the flowline terminal head, thereby



driving the flowline terminal head downward, thereby,

engaging a lower element of said pin with a pin retainer means carried by the subsea structure, thereby,

securing the flowline terminal head to the sudsea structure, and

recovering the flowline connection tool to the surface.

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**4,591,293**

**METHOD AND DEVICE FOR PLACING IN A DETERMINED RELATIVE POSITION TWO ELEMENTS SUBMERGED IN A CONDUCTING LIQUID MEDIUM**

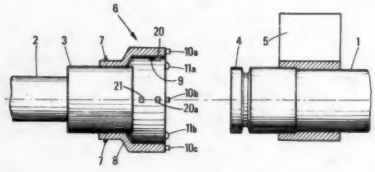
**Emile Levallois, Courbevoie; Rene Szabo, Le Pecq; Jean Clot, Saint-Orens, and Daniel Esteve, Ramonville, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France**

**Continuation-in-part of Ser. No. 444,297, Nov. 24, 1982, Pat. No. 4,468,155. This application Aug. 28, 1984, Ser. No. 645,146**

**Claims priority, application France, Nov. 24, 1981, 81 21935**

**Int. Cl.[4] F16L *1/04***

**U.S. Cl. 405—170** **12 Claims**



1. A device for permitting the relatively precise positioning of two geometrical axes respectively of two elements at least one of the elements being associated with means capable of assuring its displacement characterized in that it comprises in combination at least two acoustic emitters-receivers disposed in a first plane substantially perpendicular to one of said geometrical axes, said axis being defined as the first axis, and capable of emitting toward said axis, said two emitter-receivers not being located on a same line passing through said first axis

and in that it comprises a third emitter-receiver situated outside of said plane.

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**4,591,294**

## WELDING AND LAYING PIPELINES

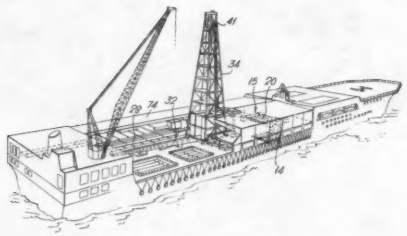
**Thomas L. Foulkes, Pangbourne, England, assignor to NIS Engineering Limited, England**

**Filed Mar. 30, 1983, Ser. No. 480,512**

**Claims priority, application United Kingdom, Mar. 31, 1982, 8209496**

**Int. Cl.[4] F16L *1/00*; B23K *26/00***

**U.S. Cl. 405—170** **24 Claims**



**1.** A high powered pipe-welding assembly mounted on a travelling pipe-laying vehicle for welding one pipe length to another in a single pass, comprising:

a deck structure being part of the vehicle;

a welding platform;

dynamic platform-mounting means mounting said welding platform on said deck structure for universal rocking of said welding platform with respect to said deck structure, said platform-mounting means being operable to rock said welding platform selectively in any direction;

gyroscopically-controlled stabilizing means on said vehicle connected to operate said platform-mounting means and rock said platform on said deck structure to keep said welding platform always substantially horizontally level irrespective of tilting of said deck structure;

at least one pipe-welding head mounted on said welding platform; and

pipe-feeding means on said vehicle to feed pipe lengths carried by the vehicle to said welding head on said welding platform in succession to be welded end to end to form a continuous pipe.

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**4,591,295**

## CURVED CONDUCTOR WELL TEMPLATE

**Bruce G. Collipp, Houston, Tex., assignor to Shell Offshore Inc., Houston, Tex.**

**Filed Dec. 10, 1984, Ser. No. 679,845**

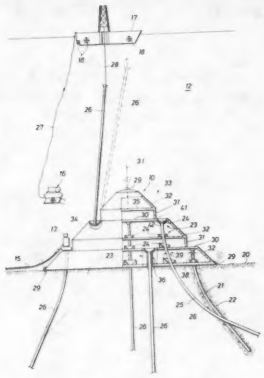
**Int. Cl.[4] E02B *17/00***

**U.S. Cl. 405—195** **17 Claims**

**1.** An anchored submerged marine structure located at the bottom of a body of water for use in the directional drilling of underwater wells from a floating vessel which comprises:

a well conductor template disposed on the floor of said body of water, having a vertical central axis defined therethrough,

well conductor movement limiting means formed by a substantial portion of the upper surface of said well conductor template, said surface arranged to prevent, during installation of at least one well conductor, said well conductor from downward vertical movement and lateral movement toward the vertical central axis of said well template, and curved conductor guide means carried by said conductor template and forming an opening curved therethrough,



for slideably receiving a well conductor passed downwardly therethrough.

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**4,591,296**

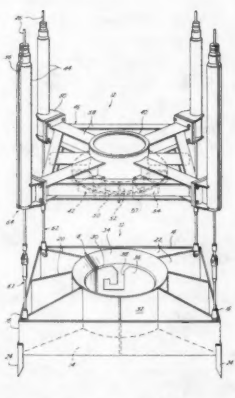
## TEMPORARY GUIDE BASE RETRIEVAL METHOD AND APPARATUS

**Herman O. Henderson, Jr., and Richard L. Coombs, both of Houston, Tex., assignors to Smith International, Inc., Newport Beach, Calif.**

**Filed Sep. 23, 1983, Ser. No. 535,306**

**Int. Cl.[4] E02D *5/74***

**U.S. Cl. 405—195** **15 Claims**



**1.** In subsea drilling operations involving a temporary guide base having a plurality of guidelines for extension to the ocean surface and a permanent guide base having a plurality of guideposts for receiving therethrough the guidelines of the temporary guide base, retrieval apparatus comprising:

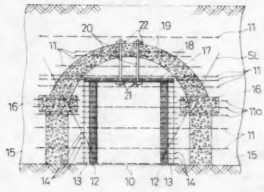
socket means forming a part of the guidelines of the temporary guide base; and

means forming a part of the guideposts of the permanent guide base for engaging said socket means when the permanent guide base is raised.

## 4,591,297
## METHOD OF BUILDING STRENGTHENED, EMBANKED FOUNDATION

**Kazuo Horimatsu, Funabashi, Japan, assignor to Tekken Construction Co., Ltd., Tokyo, Japan**

**Filed Apr. 19, 1984, Ser. No. 602,077**
**Int. Cl.[4] E21D *9/00***
**U.S. Cl. 405—258** **6 Claims**

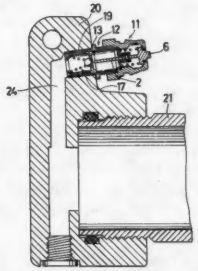



1. A method of building a strengthened, embanked foundation of roadbed including a tunnel in an embankment during its embanking work at a position corresponding to an existing road, waterway or the like in constructing a new road across said existing road or the like with said embankment, the method comprising the steps of forming at least a slope soil layer erected to form each of opposing side walls of said tunnel to be later excavated for said foundation, with a plurality of buried nets mutually vertically spaced and substntially intersecting an imaginary sliding surface appearing in the layers when excavating said tunnel between said side walls, performing said embanking work for building said foundation including peripheral portions of said slope soil layers, forming in the foundation being embanked an arch-shaped crushed-stone layer across both upper side parts of said tunnel, forming inside said crushed-stone layer a ceiling wall layer providing a hanging force with the crushed-stone layer as a supporting means, continuing said embanking work on already acheived embankment, and excavating a zone inside the slope soil and ceiling wall layers to form the tunnel while cutting and removing said buried nets lying within said zone.

## 4,591,298
## EXPANSION BEAM FOR SHORING UP SAND GUARDS

**Kenichi Fukumori, Higashi, and Katsumi Kamimura, Kyoto, both of Japan, assignors to Japan Speed Shore Co., Ltd., Osaka, Japan**

**Filed Nov. 2, 1984, Ser. No. 668,557**
**Claims priority, application Japan, Jun. 20, 1984, 59-91878[U]; Jul. 16, 1984, 59-107961[U]**
**Int. Cl.[4] E21D *5/00***
**U.S. Cl. 405—282** **12 Claims**




1. An expansion beam for shoring up sand guards, comprising:

an expansible and contractible piston and cylinder-type expansion device being actuated by pressure exerted by hydraulic liquid;

pad means, attached to opposite ends of the expansion device, for contacting the sand guards;

a plug having two ends and being connected into one of the pad means;

a first non-return valve means, arranged at one end of the two ends of the plug, for allowing the hydraulic liquid to pass from outside of the plug into the plug, said one end being exposed farther away from the pad means than the other of the two ends of the plug;

nipple means, interposed between the plug and the pad means, for communicating the plug with the pad means;

a second non-return valve means, arranged in a part of the nipple means inside of the pad means, for allowing the hydraulic liquid to pass from the plug to the nipple means;

passage means, arranged in the pad means, for allowing the hydraulic liquid to pass from the nipple means to the expansion device; and

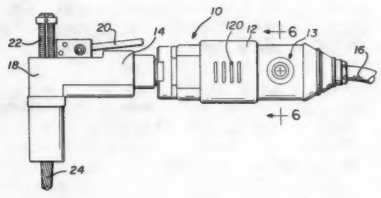
means, provided between the first and the second non-return valve means, for contacting both non-return valve means upon actuation of the first non-return means by passage of the hydraulic liquid from outside of the plug into the plug;

whereby operation of the expansion beam continues even if the plug, the first non-return valve means, and part of the nipple means outside of the pad means are broken off.

## 4,591,299
## RAPID FEED APPARATUS FOR AUTOMATIC FEED DRILLS OR THE LIKE

**Richard E. Eckman, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed May 21, 1984, Ser. No. 612,500**
**Int. Cl.[4] B23B *45/04***
**U.S. Cl. 408—1 R** **6 Claims**




5. A method of rapid feeding a drill bit in an automatic drill toward a work piece including the steps of:

yieldably locking a feed gear in said automatic drill against rotation;

rotating the motor driving said bit in a direction counter to the direction for drilling with said bit to rapidly feed said bit toward the work piece; and,

rotating said feed gear when a predetermined load is imposed on said bit to stop further rapid feed of said bit thereby avoiding damage to said drill.

## 4,591,300
## DEEP-DRILLING TOOL

**Richard Weiblen, Münsingen, and Werner Jenny, Münsingen, both of Fed. Rep. of Germany, assignors to TBT Tiefbohrtechnik GmbH & Co. KG, Fed. Rep. of Germany**

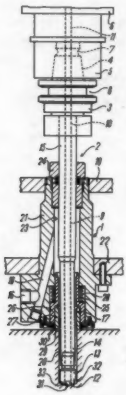
**Filed Jan. 25, 1983, Ser. No. 460,951**
**Claims priority, application Fed. Rep. of Germany, Jan. 30, 1982, 3203134**
**Int. Cl.[4] B23B *51/06***
**U.S. Cl. 408—59** **6 Claims**

1. A deep-drilling tool including a tube, a drill head and sealing means, said tube being axially movable within the

sealing means and being embodied as a tube having a passage defined therethrough,

said tube comprising: a front tube section having an outer surface defining an outer diameter; and a rear tube section joined to the front tube section, said rear tube section having an outer surface defining an outer diameter,

said sealing means comprising: a bushing within which a slip ring and a sealing ring are mounted in the axial direction of the tube, said sealing ring having at least one radial groove and means for communicating a source of pressure to each radial groove; means for retaining said slip ring stationary with said bushing relative to said sealing ring



and the tube; and an elastic O-ring mounted within each radial groove of said sealing ring, each O-ring being compressed against the outer surface of the rear tube section when pressure is applied to its radial groove and expandible into its radial groove away from said outer surface when the pressure is removed, wherein:

(i) the drill head is attached to the front tube section;

(ii) the drill head defines a diameter which is larger than the outer diameter of the front tube section and smaller than the outer diameter of the rear tube section; and

(iii) the slip ring and sealing ring define engageable surfaces which effect a seal for the rear tube section.

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**4,591,301**

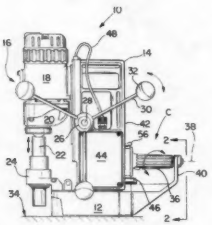
## MAGNETIC BASE MACHINE TOOL

**Keith A. Pelfrey, Hanover, Pa., assignor to Black & Decker Inc., Newark, Del.**

**Filed Dec. 12, 1984, Ser. No. 680,763**

**Int. Cl.[4] B23B *45/14***

**U.S. Cl. 408—76** **11 Claims**



**1.** A power tool comprising:

an electromagnetic base through which an electrical current can be passed for generating a magentic field:

an electric motor connected to said electromagnetic base for driving a tool;

electrical circuit means in circuit with said electromagnetic base and said electric motor for providing electric current thereto, said circuit means having first actuatable switching means for providing electric current to said electromagnetic base for effecting magnetic engagement with a work surface and having second switching means operable between an ON position for providing electric current to said motor and an OFF position; and

cam means for controlling operation of said first and said second switching means, said cam means having a first cam surface means coupled to said first switching means for actuating said first switching means to supply an electric current to said electromagnetic base and having second surface means for permitting operation of said second switching means to its ON position when said first switching means is actuated to supply electric current to said electromagnetic base and for preventing operation of said second switching means to its ON position when said first switching means is not actuated to supply electric current to said electromagnetic base.

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**4,591,302**

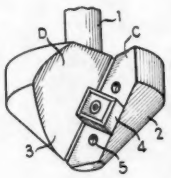
## COUNTERSINK WITH DISPOSABLE INSERT

**Norman H. Lovendahl, NL Tool Co., 39 Legion St., Maywood, Ill. 60153-2395**

**Filed Aug. 22, 1984, Ser. No. 643,163**

**Int. Cl.[4] B23B *51/10***

**U.S. Cl. 408—188** **4 Claims**



**1.** A countersink which comprises:

a standard disposable indexable insert for cutting;

a conical cutter body,

said cutter body having formed in it a square-cornered insert-holding groove that is long enough to accomodate said insert at a plurality of locations with adequate support for machining, said insert-holding groove providing an insert mounting base on which is mounted said insert and a shoulder against which said insert rests, and

said cutter body being centered and stabilized during the machining operation by being fed into a hole to where its conical surface rotatably seats against the top of said hole; and

means for attaching said conical cutter body to a rotating machine tool.

## 4,591,303
## DRILLING TOOL

**Yoshihiro Sato, Yokohama; Kenichi Sasaki, Hino; Tatsuo Miyamoto, and Hideo Tsuzaka, both of Kawasaki, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha and Toshiba Tungaloy Co., Ltd., both of Kawasaki, Japan**

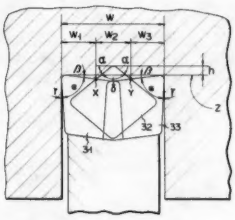
**PCT No. PCT/JP82/00413, § 371 Date Dec. 13, 1983, § 102(e) Date Dec. 13, 1983**

**PCT Filed Oct. 19, 1982, Ser. No. 562,584**

**Claims priority, application Japan, Apr. 15, 1982, 57/62972**

**Int. Cl.⁴ B23B *41/02, 51/04***

**U.S. Cl. 408—206** **6 Claims**



1. A drilling tool for trepanning, comprising a cylindrical main body and three cutting tips disposed to be equidistantly spaced apart from each other along an annular end of the main body wherein:

the cutting tips are spaced from each other along a radial direction of the main body;

the cutting tips are shaped and oriented such that cutting widths of the cutting tips in the radial direction of the main body are equal;

an intermediate cutting tip disposed at an intermediate position in the radial direction of the main body has a V-shaped cutting edge and has a side cutting edge angle falling within a range of between 5° and 40°, a distal end of said intermediate cutting tip extending in a cutting feed direction of the main body beyond distal ends of outer and inner cutting tips; and

said outer and inner cutting tips disposed at outer and inner positions in the radial direction have side cutting edge angles falling within a range of between 5° and 30°.

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## 4,591,304
## ENGRAVING APPARATUS

**Philip L. Samis, 1 Place Ville Marie Suite 1521, Montreal, Canada H3B 2B5**

**Continuation-in-part of Ser. No. 189,022, Sep. 22, 1980, Pat. No. 4,406,567. This application Jun. 1, 1982, Ser. No. 384,108**

**Int. Cl.⁴ B23Q *35/10*; B43L *13/10***

**U.S. Cl. 409—92** **26 Claims**

1. Apparatus for scribe engraving a workpiece with a miniature representation of a pattern in response to movement of a stylus following said pattern, comprising:

a. a spherically rotatable member;

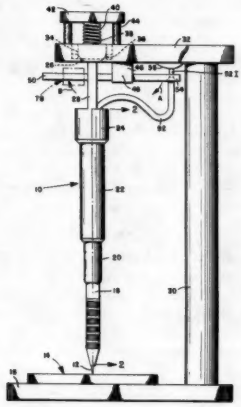
b. means connecting said scribe to said spherically rotatable member for motion of said scribe with said rotatable member as said rotatable member rotates;

c. telescoping means for connecting said rotatable member with said stylus so that said rotatable member rotates in response to stylus movement following said pattern, including;

1. a holding member providing means for retaining said stylus for axial sliding stylus movement with respect thereto; and

2. means within said retaining means for biasing said stylus axially towards said pattern and limiting distance said stylus protrudes from said holding member to a predetermined maximum which is less than length of said stylus, to affect contact of said pattern by said stylus whenever said holding member is within a preselected range of distances of said rotatable member;

d. said telescoping means further comprising means connecting said holding member with said spherically rotatable member;



e. said holding member being slidably coaxially moveable with respect to said connection means and said stylus biasing and limiting means;

f. said holding member and said connecting means being coaxial.

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## 4,591,305
## MILLING FIXTURE WITH A MANUAL TOP SPINDLE MOLDER

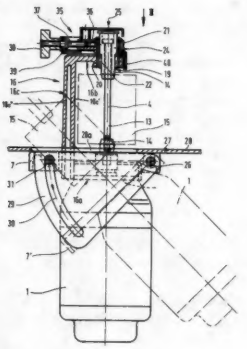
**Otto Bergler, Mühlacker-Lomersheim, Fed. Rep. of Germany, assignor to Black & Decker Overseas AG, Vaduz, Liechtenstein**

**Filed Sep. 18, 1984, Ser. No. 651,753**

**Claims priority, application Fed. Rep. of Germany, Oct. 13, 1983, 3337265**

**Int. Cl.⁴ B23C *1/20***

**U.S. Cl. 409—175** **11 Claims**



1. A milling fixture of the type having a manual top spindle and being securable to a workpiece guide, said fixture comprising:

a base plate containing parallel columns,

a drive assembly adjustably mounted on the columns, said drive assembly including:

a housing part carrying means adjustably mounted on said columns,

a tool drive shaft,

a drive journal projecting from said housing part including means for receiving one end of said drive shaft, and

a bearing block mounted on said housing part and carrying bearing means aligned coaxially with said drive journal and spaced axially therefrom to receive another end of said drive shaft, said bearing block comprising a U-shaped member including a pair of parallel legs interconnected by a web, one of said legs surrounding said drive journal and mounted to said housing part, said legs carrying said bearing means, said one leg including side walls spaced from said drive journal to form a space around said drive journal through which cooling air may be exhausted from said drive assembly.

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**4,591,306**

## PERIPHERAL DEVICE FOR MACHINE TOOLS

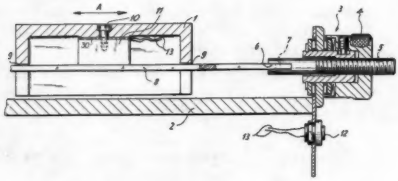
**Wolfgang Westerteicher, and Horst Schurfeld, both of Bielefeld, Fed. Rep. of Germany, assignors to Gildemeister-Devlieg System-Werkzeuge GmbH, Bielefeld, Fed. Rep. of Germany**

**Filed Mar. 16, 1984, Ser. No. 590,128**

**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1983, 3309775**

**Int. Cl.⁴ B23C *7/00***

**U.S. Cl. 409—179** **10 Claims**



**1.** In a peripheral device for machine tools, the device having at least one coordinate slide means guiding the slide in a guide for effecting rapid manual displacement along the guide for coarse adjustment and means for displacing the slide relative to the guide for fine adjustment including a driven member and an activating member, the improvement wherein the coarse adjustment means comprises electrically activated clamping means acting at least indirectly on the driven member of the fine adjustment means and an activating switch positioned adjacent to the activating member of the fine adjustment means and fastened to one of the slide and the guide, wherein the clamping means comprises a permanent magnet and an electromagnet and wherein the activating switch is operable to effect excitation of the electromagnet and wherein the magnets are poled so that the magnetic field of the permanent magnet is cancelled when the electromagnet is excited to obtain an equilibrium of forces.

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**4,591,307**

## CORNER FITTING WITH RETRACTABLE TWIST LOCK

**Martin Clive-Smith, 151 Broomwood Road, London SW11 6JU, England**

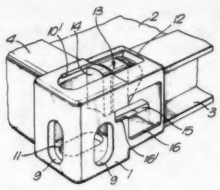
**Filed Dec. 30, 1983, Ser. No. 567,273**

**Claims priority, application United Kingdom, Dec. 30, 1982, 8236980**

**Int. Cl.⁴ B65J *1/22***

**U.S. Cl. 410—83** **21 Claims**

**1.** A cargo carrier including frame means, a hollow member mounted on the frame means, one surface of the hollow member defining an aperture therein and arranged to lie in a major plane, and location means mounted on the hollow member for movement between a raised position and a lowered position, the location means comprising a first portion arranged to project through said aperture in said one surface when the location means is in said raised position, and a second portion



arranged to define one end of the said aperture in said one surface when the first portion of the location means is in the lowered position of the location means below the major plane.

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**4,591,308**

## GUIDE JIG FOR LIFTING AN OUTER WALL MEMBER OF A CURTAIN WALL

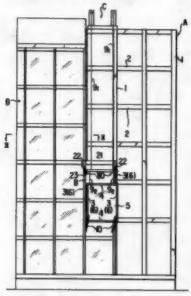
**Tetsuji Imai, Kurobe, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan**

**Filed Jul. 25, 1984, Ser. No. 634,152**

**Claims priority, application Japan, Jul. 29, 1983, 58-177066[U]**

**Int. Cl.⁴ E04G *21/16***

**U.S. Cl. 414—11** **4 Claims**



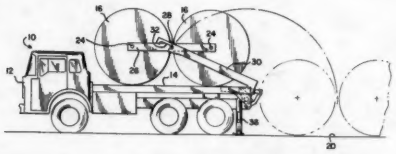
**1.** A guide jig for lifting an outer wall member of a curtain wall comprising a nearly L-shaped arm having two legs extending in two directions making a predetermined angle therebetween, first and second brackets connected to tip end portions of the respective legs of said arm so as to be rotatable about respective axes substantially perpendicular to a plane containing said arm, first and second sliders fixedly secured to said first and second brackets, respectively, a rope engaging member provided at a tip end portion of one leg of said arm, and locking means provided between said arm and one of said brackets for connecting or disconnecting said arm to or from a free end of said one bracket, whereby when said arm and the free end of said one bracket are connected to each other by said locking means, said first and second sliders are held apart from each other by a predetermined distance in the direction perpendicular to a lifting plane of the outer wall member, provided that they are kept directed nearly in the vertical direction.

4,591,309

## DUAL-REEL LOADER CONSTRUCTION

James A. Clapp, Jr., Hammond, Ind., assignor to Champion Corporation, Hammond, Ind.

Filed Jan. 30, 1984, Ser. No. 575,175
Int. Cl.[4] B60P *1/48;* B65H *19/20*
U.S. Cl. 414—546 4 Claims



1. In a reel loader apparatus comprising a truck defining a supporting bed and a rear end portion and having a mechanism for loading cable reels onto said supporting bed and for unloading the reels, the mechanism including a pair of spaced-apart pivotally mounted arms attached at the rear end portion of the truck and having engaging means at their outer ends for engagement with said reels to thereby achieve lifting of the reels during loading and unloading operations, the reels carrying laterally extending spindles for use in lifting the reels, the improvement comprising means for simultaneously loading a pair of reels onto said bed whereby the reels are positioned one in front of the other, and for unloading the pair of reels from the bed, said loading means including two bar means extending between said pair of reels, one bar means being located on each side of said pair, means connecting said bar means to the respective spindles whereby the bar means hold the reels in a predetermined spaced-apart relationship, and engaging means carried by each of the bar means for engagement with said engaging means on respective ones of said arms whereby said arms are adapted to lift the two bar means for loading and unloading reels, said means connecting the bar means to the spindles permitting unwinding of the cable from a reel supported on the bed, and said pair of spaced-apart arms and their respective bar means holding said reels in said predetermined spaced-apart relationship on said bed during travelling of the truck or unwinding.

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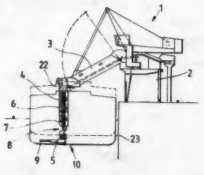
4,591,310

## METHOD FOR LOADING AND UNLOADING LARGE AREA TRANSPORTATION MEANS

Jörg Toaspern, Buchsbaumweg 10, and Anton Grosshauser, Bi de Windmöl 1 e, both of D-2000 Schenefeld, Fed. Rep. of Germany

Continuation of Ser. No. 555,423, Nov. 23, 1983, abandoned, which is a continuation of Ser. No. 387,001, Jun. 10, 1982, abandoned. This application Feb. 11, 1985, Ser. No. 700,066
Claims priority, application Fed. Rep. of Germany, Jul. 1, 1981, 3125880
Int. Cl.[4] B65G *67/60*
U.S. Cl. 414—786 1 Claim



1. A method for loading and unloading goods from large area transportation means, such as ships or the like, by means of a vertical spirally curved conveyor connected to goods loading and unloading means at the upper end, a pivotable horizontal conveyor (5) arranged on the lower end portion of the vertical conveyor for receiving or discharging the goods, and a lower spiral conveyor segment and goods transfer spiral interposed between the vertical and horizontal conveyors; in which method during loading and unloading, the goods transfer spiral (8) which is in fixed operative connection with the horizontal conveyor (5) is moved over the entire pivoting area in a congruent manner to the lower spiral conveyor segment (7) of the vertical conveyor (4) and for loading the goods transfer spiral is moved beneath the spiral conveyor segment, whereas for unloading it is moved over the spiral conveyor segment in such a way that an overlapping zone is always formed between the lower spiral conveyor segment and the goods transfer spiral; in which the goods transfer spiral (8) is moved downwards by the simultaneous rotation and lowering in accordance with the curved spiral of the vertical conveyor until the goods transfer spiral (8) is spaced from the lower end portion of the lower spiral conveyor segment (7), and in which the goods transfer spiral (8) is then horizontally rotated about the longitudinal axis of the vertical conveyor until the goods transfer spiral (8) is moved below the lower spiral conveyor segment for loading and above the lower spiral conveyor segment for unloading.

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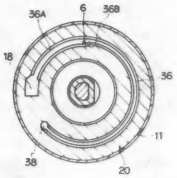
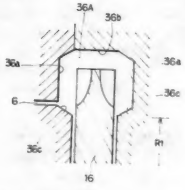
4,591,311

## FUEL PUMP FOR AN AUTOMOTIVE VEHICLE HAVING A VAPOR DISCHARGE PORT

Takeshi Matsuda; Masasi Miyamoto, both of Kariya, and Toshihiro Takei, Okazaki, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Aug. 10, 1984, Ser. No. 639,434
Claims priority, application Japan, Oct. 5, 1983, 58-187371
Int. Cl.[4] F04D *5/00*
U.S. Cl. 415—53 T 6 Claims





1. A pump apparatus comprising:

a regenerative type pump including a pump housing, an impeller rotatably housed in said pump housing and suction and discharge ports defined by said pump housing and spaced circumferentially of said impeller;

said impeller having a substantially disc-like shape and being provided with a plurality of circumferentially spaced vanes formed at an outer periphery of said impeller;

said pump housing cooperating with said impeller to define a circumferential fluid passage surrounding said vanes and extending between said suction port and said discharge port, said circumferential fluid passage having an enlarged portion formed at a low pressure side of said circumferential fluid passage beginning from said suction port and

extending for an angular range of less than 180° measured from said suction port, a cross-sectional area of said enlarged portion being larger than the remainder of said circumferential fluid passage;

means disposed in said circumferential fluid passage between said suction and discharge ports to provide a circumferential seal therebetween; and

a vapor discharge port formed in said pump housing and at a downstream end of said enlarged portion for communicating said fluid passage with the outside thereof.

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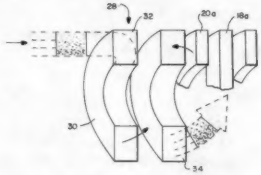
**4,591,312**

## PARTICLE LADEN FLUID POWERED GAS TURBINE AND LIKE APPARATUS AND METHOD OF OPERATION

**Richard A. Wenglarz, Export, Pa., assignor to Electric Power Research Institute, Palo Alto, Calif.**

**Filed Aug. 22, 1983, Ser. No. 525,111**
**Int. Cl.⁴ F01D** *25/00*
**U.S. Cl. 415—121 R** **4 Claims**



1. A fluid flow driven apparatus, comprising:

(a) means including an elongated drive shaft mounted for rotation about its own axis and one or a plurality of rotors fixedly connected to said shaft at axially spaced locations along its length;

(b) means defining a compartment for containing at least that portion of said drive shaft supporting said rotors;

(c) means for directing a continuous fluid stream, laden with particles, into said compartment;

(d) flow deflecting means within said compartment for causing the fluid stream entering therein to move axially therethrough along a helical path around said shaft in order to engage said rotors in a way which causes said shaft to rotate about its axis; and

(e) particle redistribution means comprising a fixed continuous spiral tube acting on said fluid stream at a location upstream of said rotors in a way which places more particles within the stream radially further from the axis of said drive shaft as the fluid initially moves into said helical path than would be the case without said particle redistribution means, whereby to redistribute said particles radially outwardly relative to said drive shaft as they engage said rotors in order to decrease rotor wear closer to said shaft.

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**4,591,313**

## PROPELLER PITCH CONTROL SYSTEM AND APPARATUS

**Henry J. Miyatake, Bellevue, and Seiya Sakurai, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Dec. 30, 1983, Ser. No. 567,054**
**Int. Cl.⁴ B64C** *11/44*
**U.S. Cl. 416—155** **30 Claims**

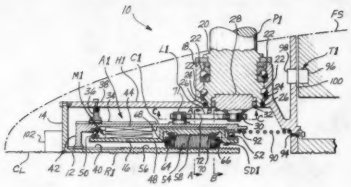
1. An adjustable pitch propeller, comprising:

an axially elongated tubular hub having a center axis;

a plurality of propeller blades mounted on said hub, each for rotation in position about a radial axis;

an electromechanical linear actuator housed within said hub, said actuator having a longitudinal axis coinciding with the axis of the hub, said actuator including:

a rod member which is fixed in position relative to said hub, a casing which is extendible and retractable axially relative to said rod member, a rotary electric motor within said casing, said motor including a rotor, and, planetary screw drive transmission means within said casing drivingly interconnecting said rotor and said casing, for causing said casing to move axially relative to said rod member in response to operation of said motor;



mechanical drive means interconnecting said casing and said propellers, for causing the propellers to rotate in position in response to axial movement of said casing; and

compression spring means for maintaining an axial loading on the planetary screw drive transmission means in an amount sufficient to prevent slippage within the planetary screw drive transmission.

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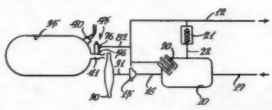
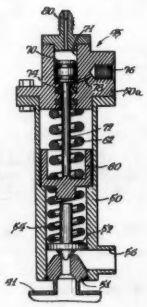
**4,591,314**

## HYDRAULIC POWER SUPPLY SYSTEM UTILIZING A SOLID PROPELLANT GAS GENERATOR

**Kent Weber, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Jul. 9, 1984, Ser. No. 629,162**
**Int. Cl.⁴ F04B** *49/00, 17/00;* **F02C** *9/00, 3/26*
**U.S. Cl. 417—47** **12 Claims**





1. A hydraulic power supply system utilizing a turbine-driven pump in a hydraulic circuit and a solid propellant gas generator providing gas for driving the turbine with a gas pressure relief value operable to maintain the gas generator at constant pressure characterized by means for varying the relief setting of the gas pressure relief valve to control the burn rate of the gas generator by controlling the gas generator pressure dependent upon the requirements imposed on the pump.

10. A hydraulic power supply system comprising, a pump for supplying fluid to a hydraulic circuit, a gas-driven turbine for driving the pump, a solid propellant gas generator for supplying gas under pressure to said gas-driven turbine, a gas pressure relief valve operatively connected to said solid propellant gas generator to maintain the latter at constant pressure including a valve member urged to a closed position on a valve seat by a first spring establishing a first pressure setting, preload means for increasing the pressure setting of the gas pressure relief valve including means acting on said first spring to

provide a preload force thereon, a hydraulic piston connected to said means acting on the first spring and subject to fluid pressure acting in a direction to reduce the force of said preload means, means for directing a fluid pressure to said hydraulic piston inversely proportional to flow demand on the pump whereby a low flow demand on the pump will cause the hydraulic piston to reduce the force of the preload means and a high flow demand on the pump will not have any effect on the preload means.

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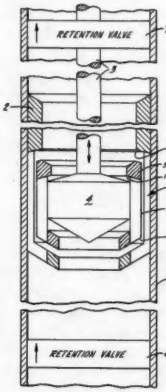
**4,591,315**

## PISTON WITH COMPOSITE RETENTION VALVE

**Amnon M. Vadasz Fekete, Av.Principal de Sebucan, Resid.Jardines de Sebucan, Apto.7-D. Urb., Sebucan, Caracas, Venezuela**

**Filed Sep. 29, 1982, Ser. No. 427,157**
**Int. Cl.[4] F04B** *3/00, 7/00*
**U.S. Cl. 417—259** **4 Claims**




**1.** A positive displacement composite retention valve pump apparatus having a piston in which the actual flow equals the theretical maximum flow through a composite traveling retention valve carried by the piston, said apparatus including, in combination,

a confined fluid flow conduit,

a piston adapted for reciprocal movement within the fluid flow conduit between upstream and downstream limit positions,

piston reciprocating means, and

pressure responsive check valve means located upstream with respect to the piston in the fluid flow conduit,

said pressure responsive check valve means being operable to permit fluid flow therethrough in a downstream direction toward the piston, and to preclude fluid flow therethrough in an opposite direction,

said piston being composed of a plurality of parts which are relatively movable with respect to one another prior to movement of the entire piston in a direction to positively displace fluid therein,

said piston including a composite traveling valve consisting of a plug, a cylinder reciprocable within the confined fluid flow conduit, and a ring located between the cylinder and the plug,

said ring being arranged to make sealing engagement with the cylinder at a first seal location and to make sealing engagement with the plug at a second seal location,

said position reciprocating means being operatively connected to the plug,

said composite traveling valve being arranged to close by the application of an external force to the piston reciprocating means and thereby the plug prior to suction movement of the cylinder,

the plug, ring and cylinder being so proportioned that the flow area between the plug and the ring, and the flow area between the ring and the cylinder is equal to the flow area between the cylinder and the piston reciprocating means whereby the maximum flow area through the traveling valve is provided.

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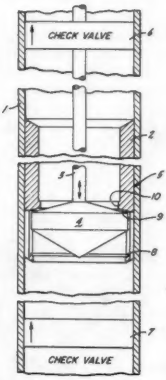
**4,591,316**

## PISTON WITH SIMPLE RETENTION VALVE

**Amnon M. Vadasz Fekete, Av. Principal de Sebucan, Resid. Jardines de Sebucan, Apto. 7-D, Urb. Sebucan., Caracas, Venezuela**

**Filed Sep. 29, 1982, Ser. No. 427,158**
**Int. Cl.[4] F04B** *3/00, 7/00*
**U.S. Cl. 417—259** **2 Claims**




**1.** A positive displacement retention valve pump apparatus in which the actual flow equals the theoretical maximum flow through the retention valve, said apparatus incldiuing, in combination,

a confined fluid flow conduit,

a piston adapted for reciprocal movement within the fluid flow conduit between upstream and downstream limit positions,

piston reciprocating means, and

pressure responsive check valve means located upstream with respect to the piston in the fluid flow conduit,

said pressure responsive check valve means being operable to permit fluid flow therethrough in a downstream direction toward the piston, and to preclude fluid flow therethrough in an opposite direction,

said piston being composed of a plurality of parts which are relatively movable with respect to one another,

said piston including a simple retention valve consisting of a plug means, a cylinder having a minimum and a maximum internal cross section flow area therein and being reciprocable within the confined fluid flow conduit, and a seat on the cylinder for the plug means,

said piston reciprocating means being operatively connected to the plug means,

said piston being arranged to close, and thereby block the fluid flow conduit, prior to the suction stroke of the piston,

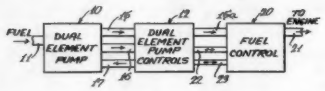
the flow area between the plug means and the fluid flow conduit being equal to the flow area between the plunger reciprocating means and the minimum internal cross sectional flow area of the cylinder downstream from the cylinder seat whereby the flow through the piston is optimized.

4,591,317

## DUAL PUMP CONTROLS

Albert L. Markunas, Roscoe, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Apr. 19, 1983, Ser. No. 486,387
Int. Cl.[4] F04B 49/08; F02C 9/18; G05D 7/00
U.S. Cl. 417—288 21 Claims




1. A pump control for controlling the delivery of fuel from two fixed displacement pump sources to a device comprising, a delivery line from one pump source to said device, first bypass means connected to said delivery line including a modulating valve having a movable valve member with a valve land positionable to control the rate of flow from the delivery line through the first bypass means, means selectively connecting the second pump source to said delivery line including a passage through the modulating valve which is either opened or closed by a second valve land of the movable valve member through which fuel may flow from the second pump source to the delivery line, and second bypass means for bypassing the output flow from the second pump source when said second valve land prevents flow to the delivery line, and means for establishing the discharge pressure of the second pump source at a pressure slightly greater than that in said delivery line prior to said second valve land opening the modulating valve passage.

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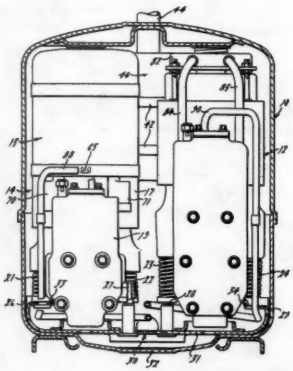
4,591,318

## DUAL COMPRESSORS

John P. Elson, Sidney, Ohio, assignor to Copeland Corporation, Sidney, Ohio

Continuation of Ser. No. 491,542, May 4, 1983, abandoned, which is a division of Ser. No. 231,016, Feb. 3, 1981, Pat. No. 4,396,360. This application Mar. 18, 1985, Ser. No. 712,510
Int. Cl.[4] F04B 39/12
U.S. Cl. 417—312 9 Claims



1. In a multi-compressor assembly including a housing having top and bottom walls and two vertically mounted motor-compressors of differeing height therein, each of said motor-compressors comprising a compressor at the bottom and an electric motor at the top, each of said motor-compressors having a motor cover rigidly attached thereto and extending upwardly therefrom, the height of the motor cover of the shorter motor-compressor exceeding the height of such motor-compressor sufficiently to substantially compensate for the differing height of said motor-compressors, and means for resiliently supporting said motor-compressors including means engaging the cover of the shorter motor-compressor and the topwall.

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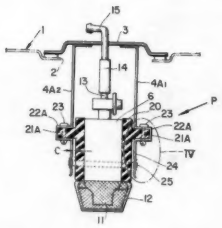
4,591,319

## IN-TANK FUEL FEED PUMP SUPPORTING DEVICE

Teruo Takahashi, Zama, and Isao Hayashi, Yokohama, both of Japan, assignors to Nissan Motor Company, Limited, Kanagawa, Japan

Filed Jun. 26, 1984, Ser. No. 624,748
Claims priority, application Japan, Jul. 19, 1983, 58-131767
Int. Cl.[4] F04B 21/00
U.S. Cl. 417—360 8 Claims



1. A device for supporting a fuel feed pump disposed within a fuel tank having a tank lid comprising:

a plurality of elongated stays fixed to an undersurface of said tank lid to extend vertically in a substantially symmetrical arrangement around a space having an axis, each of said stays having portions substantially parallel to said axis and an intermediate bent U-shaped portion defining a recess, the recesses of the plurality of stays facing said space;

vibration damping and supporting means including an elastic member around a fuel feed pump in said space on said axis and between said pump and said stays, said elastic member having an integral mounting portion extending outward relative to said axis, said mounting portion having a shape adapted to be fitted in said recesses of said stays for supporting said fuel feed pump by said stays and elastic member and damping vibration energy produced substantially in shear mode by said fuel feed pump when said fuel feed pump vibrates in the direction of said axis; and

the outer periphery of said vibration damping and supporting means elastic member having clearance with said substantially parallel portions of said stays for allowing said integral mounting portion to be deformed substantially vertically in shear mode when said fuel feed pump vibrates in the direction of said axis.

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4,591,320

## SUBMERSIBLE PUMPING UNIT

Kenneth E. Pope, Rte. #3, Box 217, Wagoner, Okla. 74467

Filed Jan. 31, 1984, Ser. No. 575,511
Int. Cl.[4] F04B 47/08
U.S. Cl. 417—390 4 Claims

1. A submersible downhole pump for use in a string of tubing extending from the earth's surface into a fluid producing formation, comprising:

a tubular housing;

a packer means sealing said tubular housing relative to the interior of the tubing string;

a tubular piston rod of external diameter less than the internal diameter of said tubular housing and slideably received within said tubular housing;

top and bottom piston means adjacent the ends of said piston

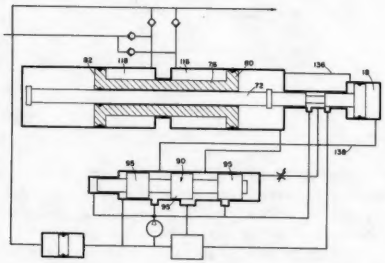
rod slideably and sealably engaging the interior of said tubular housing; and

seal means within said tubular housing sealably slideably receiving said piston rod intermediate said piston means;

a tubular shift tube slideably and sealably received within said tubular piston rod;

a motor driven hydraulic pump affixed to said tubular housing within the well tubing providing a source of the hydraulic fluid under pressure, the hydraulic fluid being isolated from the formation fluid;

a valve means in communication with said hydraulic pump produced source of fluid pressure and providing means to direct fluid pressure from said pump between first and second fluid flow paths, one of said flow paths acting on said top piston means to force the piston rod downwardly and the second flow path communicating through said



shift tube to act on said bottom piston means to force the piston rod and its piston means upwardly;

means to actuate said valve means to apply fluid pressure to said first and second fluid flowpaths in response to the movement of said shift tube which, in turn, is moved in response to the movement of said piston rod;

valve means in communication with the interior of the tubing string above and below said packet means and the interior of said tubular housing above and below said seal means for causing flow of formation fluid within the tubing string from below said packer means to above said packer means and thence to the earth's surface as said piston rod is reciprocated; and

means to superimpose the pressure of the formation fluid within said tubing string above said packer means upon said hydraulic fluid.

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**4,591,321**

## METHOD AND APPARATUS FOR REMOVING PRESSURE PEAKS AND DAMPING HYDRAULIC PRESSURE WAVES AND PEAKS FROM PRESSURE VARIATIONS IN THE FEED DUCTS OF A HYDRAULIC PUMP AND A PUMP FOR IMPLEMENTING THE METHOD

**Alain Devaux, Saint Mande, France, assignor to Societe d'Etudes de Machines Thermiques S.E.M.T., S.A., Saint Denis, France**

**Filed Mar. 27, 1985, Ser. No. 716,674**

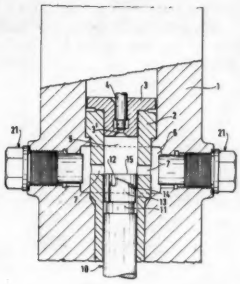
**Claims priority, application France, Mar. 29, 1984, 84 04904**

**Int. Cl.[4] F02M** *59/44*

**U.S. Cl. 417—499** **13 Claims**

1. A method of removing pressure peaks and damping hydraulic pressure oscillations in a feed duct supplying hydraulic fluid to a positive displacement hydraulic pump, the pump having a feed chamber open to the feed duct and the pressure peaks and oscillations resulting from the periodic return of high energy jets of excess fluid from a working chamber of the pump to the feed chamber, the method comprising:

directly absorbing at least part of the kinetic energy of each jet by temporarily increasing the volume of the feed



chamber by a total value of from 10% to 30% of the maximum capacity of the working chamber.

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**4,591,322**

## ECCENTRIC ARCHIMEDIAN SCREW PUMP OF ROTARY DISPLACEMENT TYPE

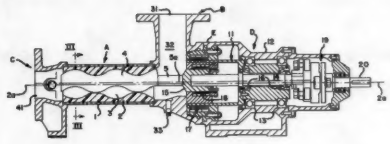
**Tsuneo Ono, and Yukinori Nakamura, both of Kobe, Japan, assignors to Heishin Sobi Kabushiki Kaisha, Kobe, Japan**

**Filed Dec. 28, 1984, Ser. No. 687,011**

**Claims priority, application Japan, Dec. 28, 1983, 58-247791; Dec. 29, 1983, 58-245709; Feb. 28, 1984, 59-037468**

**Int. Cl.[4] F04C** *2/00, 5/00, 15/00*

**U.S. Cl. 418—48** **2 Claims**



1. An eccentric Archimedian screw pump of the rotary displacement type, comprising a stator having a spiral cavity formed therethrough, said cavity having a longitudinally extending centerline and being substantially oval in cross section, a spiral rotor positioned in said cavity, said rotor being substantially circular in cross section and having a centerline, a shaft connected to said rotor and rotatably mounted eccentrically from said centerline of said rotor by a distance e, a drum mounted for rotation concentrically with said cavity centerline, means journalling said shaft on said drum but eccentrically from the drum axis by said distance e, drive means rotatable substantially on said centerline of said cavity, and a break joint forming a direct coupling between said drive means and said shaft.

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**4,591,323**

## EXTRUDER AND CALIBRATING APPARATUS FOR MAKING RIBBED OR GROOVED PIPE

**Per Boen, Snaroya, Norway, assignor to A/S Sonnichsen Rorvalseverket, Oslo, Norway**

**PCT No. PCT/NO84/00035, § 371 Date May 8, 1985, § 102(e) Date May 8, 1985, PCT Pub. No. WO85/01244, PCT Pub. Date Mar. 28, 1985**

**PCT Filed Sep. 18, 1984, Ser. No. 734,275**

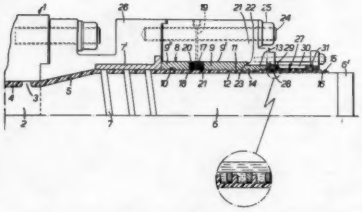
**Claims priority, application Norway, Sep. 23, 1983, 833433**

**Int. Cl.[4] B29C** *47/94, 47/90;* **B29D** *23/18*

**U.S. Cl. 425—97** **11 Claims**

1. An extruder assembly (1) for extruding round, cylindrical plastic pipe having a smooth inner wall and a ribbed or ridged outer pipe wall, comprising a feed screw (2) for transporting

and softening the plastic material (4) and an annular nozzle having a central mandrel (6) which constitutes a cylindrical, coaxial extension of the feed screw, wherein the stationary, outer mold part (8) of the nozzle is provided with one or more parallel, helical grooves (14) with the spiral extending in the direction of rotation of the screw and mandrel, wherein the outer mold part (8) is provided with a lubricating device (17)



for lubricating the molding surface of the mold part, and wherein a calibrating device (27) with helical grooves (28) is provided downstream of the annular nozzle, characterized in that the lubricating device (17) consists of slots (21) between parts of the outer mold wall, which parts are movable in relation to each other for adjusting the slot width, and that the slot or slots (21) are connected to a lubricant source (19) that supplies lubricant under pressure.

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**4,591,324**

**GRANULATING APPARATUS**

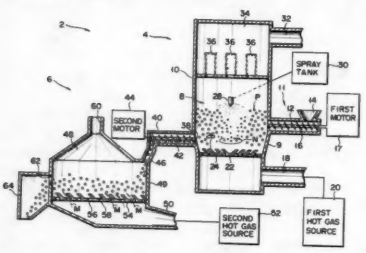
**Atsushi Kubota, Shizuoka, Japan, assignor to Okawara Mfg. Co., Ltd., Shizuoka, Japan**

**Filed Apr. 17, 1984, Ser. No. 601,241**

**Claims priority, application Japan, Apr. 19, 1983, 58-69805**

**Int. Cl.[4] B29C *67/02*; F26B *3/16***

**U.S. Cl. 425—222** **11 Claims**




1. A granulating apparatus for continuously producing granules each having a predetermined size from powdery particles which comprises:

a body having a peripheral wall defining a granulation chamber;

means for feeding raw powdery particles to the granulation chamber;

binder solution-feeding means which is set inside of the granulation chamber to spray a binder solution on the raw powdery particles held in the granulation chamber to form granules;

gas-feeding means for introducing a whirling upward flow of gas adjacent to the granulation chamber, subjecting the formed granules to a centrifugal force and distributing granules of said predetermined size toward the peripheral wall of the granulation chamber; said gas flow at least partially drying granules in said granulation chamber;

granule discharging means provided in the peripheral wall of the granulation chamber to take out granules of said predetermined size which are drawn near said peripheral wall; and

means for drying fully formed granules which are continuously delivered from said granule discharging means.

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**4,591,325**

**APPARATUS FOR PRODUCING GAS-PERMEABLE PRESSED ARTICLES**

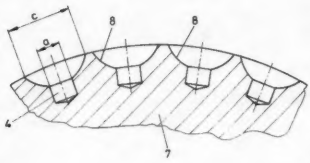
**Erich Kollenz, Leoben, Austria, assignor to Voest-Alpine Aktiengesellschaft, Linz, Austria**

**Filed Jul. 17, 1985, Ser. No. 756,083**

**Claims priority, application Austria, Jul. 18, 1984, 2330/84**

**Int. Cl.[4] B29C *3/02***

**U.S. Cl. 425—233** **10 Claims**



1. Apparatus for producing gas-permeable pressed articles comprising opposed mold elements having opposed mold cavity means, the mold cavity means having surfaces which are provided with blind recess means the inner width of which is smaller than the inner width of the mold cavity means so that the recess means form areas of the pressed articles which are more gas permeable than the areas of the pressed articles which are formed by the surfaces of the mold cavity means.

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**4,591,326**

**PRESSING DEVICE FOR PRODUCING COMPACTS FROM SOURCE MATERIAL IN POWDER FORM, IN PARTICULAR PULVERIZED NUCLEAR REACTOR FUEL**

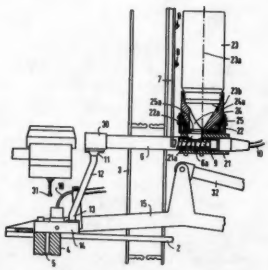
**Manfred Adelmann, Bruchköbel, Fed. Rep. of Germany, assignor to ALKEM GmbH, Hanau, Fed. Rep. of Germany**

**Filed Jan. 31, 1985, Ser. No. 696,457**

**Claims priority, application Fed. Rep. of Germany, Feb. 13, 1984, 3405084**

**Int. Cl.[4] B30B *15/30*; B29C *3/04, 3/06***

**U.S. Cl. 425—256** **3 Claims**



1. Pressing device for producing compacts from source material in powder form in particular pulverized nuclear reactor fuel, comprising a die-plate contained in a platen and having a bore associated with a ram for receiving source material powder, a filling shoe disposed on a movable arm and bearing on and displaceable over the platen for filling source material powder into the die-plate bore, an outflow opening in the

filling shoe directed toward the platen with a passing wheel as filling aid means, a hose connecting the outflow opening of the filling shoe to a metering means with coaxial feed tube of a reservoir for source material powder, the combination therewith of a passing sieve for the source material powder with an associated passing element for passing the source material powder through the passing sieve by a relative movement between passing sieve and passing element arranged in the transport path for the source material powder, between the end of the feed tube of the reservoir and the outflow opening of the filling shoe.

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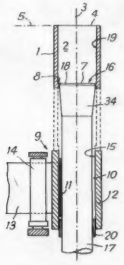
**4,591,327**

## DEVICE FOR LAYING AND PREFORMING A SECTION OF WEB AND MOULDING UNIT ASSOCIATED WITH SUCH A DEVICE

**Jean-Claude Hautemont, Gyf-sur-Yvette, France, assignor to Erca Holding, S.A.R.L., Les Ulis, France**

**Filed Jun. 7, 1983, Ser. No. 501,770**
**Claims priority, application France, Jun. 14, 1982, 82 10355**
**Int. Cl.[4] A01J *21/02***
**U.S. Cl. 425—305.1** **27 Claims**



**1**. Device for laying and preforming a section of web, in a forming mould which is provided at a container thermoforming station, in a packing machine and which comprises a moulding unit having at least one upwardly open forming chamber, said open forming chamber being defined by at least one vertically movable part presenting, at its lower end, a bottom opening, said bottom opening having a transverse section, said bottom opening adapted to be closed by a bottom plate mobile with respect to said moulding unit of which at least a part is adapted to move vertically between a high, so-called thermoforming position and a low, so-called stripping position for the recipients, device of the type comprising:

a unit for pre-winding the section of web, said unit provided with a cylindrical pre-wind cavity having a lateral face, said pre-wind cavity open at least towards the forming chamber, adapted to be able to receive, laterally, a section of web and disposed so as to be located below the moulding unit and in alignment with said forming chamber which comprises at least one inner shoulder defining the bottom opening and extending perpendicularly to the vertical axis and towards the inside of said chamber at the most until it is plumb with said lateral face of the pre-wind cavity;

a shaping member which is mounted on a support rod and constituted by the bottom plate of said forming chamber, having a cylindrical lateral face of which the section at the bottom plate is similar to but less than the area of an end of said forming chamber, with the result that the distance between the lateral face of the shaping member and the lateral face of the forming chamber is at least equal to the thickness of the section of web, and which is adapted to penetrate into the forming chamber and to apply said section of web and to maintain it applied against the lateral face of said forming chamber, said shaping member, or bottom plate of said forming chamber being substantially axially midway of said forming chamber when said forming chamber occupies the so-called low or stripping position, said stripping position allowing said containers to be expelled from said mould, and

a transfer member comprising a transfer piston connected to a control rod and mounted to slide in the pre-wind cavity about the rod and mounted to slide in the pre-wind cavity about the rod supporting the shaping member, wherein the shaping member is mounted to move between, on the one hand, a lower position corresponding either to the position of closing of the bottom opening in the forming chamber when the moulding unit occupies its high thermoforming position or to the median zone of the forming chamber when said unit occupies the stripping position and, on the other hand, an upper position corresponding to the median zone of said forming chamber when the moulding unit occupies the thermoforming position in that an annular slot for passage is defined between the lateral face defining the shaping member and certain corresponding parts of the lateral face of the forming chamber in a median thereof when the shaping member is located at the level of the median zone of the forming chamber, the thickness of the slot being at least equal to that of the section of web, and in that the transfer piston is adapted to penetrate in the forming chamber when the moulding unit is located immediately above the pre-wind cavity.

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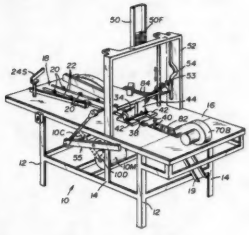
**4,591,328**

## APPARATUS FOR FORMING FORTUNE COOKIE SHAPED ARTICLES

**Yau T. Cheung, 2348 S. Canal St., Chicago, Ill. 60616**

**Filed Apr. 26, 1985, Ser. No. 727,592**
**Int. Cl.[4] A21C *11/02, 15/02***
**U.S. Cl. 425—324.1** **8 Claims**



**1**. In a food processing machine of the type that processes a succession of disc shaped food items into fortune cookie shape wherein the disc shape is folded into a half-moon shape and corners of the half-moon shape are bent downwardly, the improvement comprising:

a first cylindrical worm gear member defining a helical groove about its surface;

a second cylindrical worm gear member defining a helical groove about its surface, said second gear member being of the same pitch as that of the first gear member but defined in the opposite direction; and

means for mounting and driving the gear members in a side by side array such that the grooves may receive the sides of the fortune cookie shaped food items and advance them longitudinally parallel to the long axis of said groove members,

said worm gear members also including means at one end thereof for folding the food item from its half-moon shape into substantially its final fortune cookie shape as it is delivered to the worm gear members.

**4,591,329**

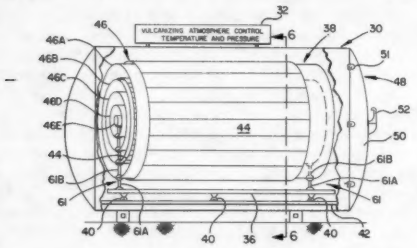
## CONCENTRIC LOADING VULCANIZER AND METHOD OF VULCANIZING

**Thomas L. Kelly, Kelly Energy Systems, Inc., P.O. Box 2583, Waterbury, Conn. 06723**

**Filed Jul. 18, 1984, Ser. No. 632,017**

**Int. Cl.[4] B29H** *5/01*

**U.S. Cl. 425—340** **11 Claims**




1. An apparatus for vulcanizing sheets of unvulcanized elastomeric material and the like comprising:

(a) a vulcanizer having a generally cylindrical pressure chamber therein;

(b) means providing a vulcanizing atmosphere within the chamber; and

(c) a series of concentric mandrels mounted in the chamber of the vulcanizer with the individual mandrels in radially spaced relationship to one another, the mandrels serving as individual supports for multiple wraps of sheet material to be subjected to the vulcanizing atmosphere.

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**4,591,330**

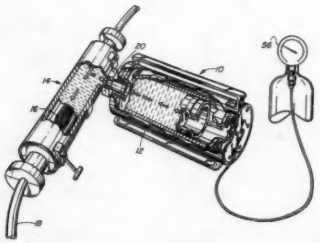
## MOULDING EQUIPMENT

**Leonard J. Charlebois, Kanata, and Peter A. Brown, Ottawa, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada**

**Filed Nov. 5, 1984, Ser. No. 668,599**

**Int. Cl.[4] B29C** *45/03*

**U.S. Cl. 425—567** **3 Claims**




1. Moulding equipment comprising a mould and a dispensing container for dispensing molten mouldable material into the mould, the mould and container having cooperable male and female connectors to connect them together for allowing transfer of pressurized fluid from the container into the mould, the female connector having a slot extending radially from its outer periphery to a central orifice and with the length of the slot lying in a circumferential direction of the orifice, the slot pivotally carrying a locking member about an axis parallel to the axis of the central orifice, the locking member being pivotally movable through the slot into and out of a locking position in which the locking member has a locking cam projecting radially into the orifice; and the male connector formed with a circumferential recess and being insertable into the orifice with the recess aligned with the cam for movement of the cam into the recess and, during movement of the locking member into the locking position, surfaces of the cam and the circumferential recess oppose each other axially of the connectors and move relatively one across the other while normally offering sufficiently low resistance to movement of the locking member so as to allow for manual operation, and during transfer of pressurized fluid, said surfaces are urged together axially of the connectors by a force applied by internal fluid pressure to provide or increase resistance to relative movement of the surfaces, thereby to increase resistance to movement of the locking member out of the locking position.

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**4,591,331**

## APPARATUS AND METHOD FOR BURNING FUEL

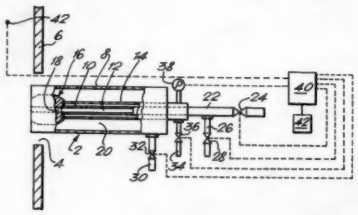
**Colin Moore, Chellow Dene, England, assignor to The BOC Group, plc, London, England**

**Filed Sep. 11, 1984, Ser. No. 651,451**

**Claims priority, application United Kingdom, Sep. 14, 1983, 8324644**

**Int. Cl.[4] F23N** *5/24*

**U.S. Cl. 431—16** **20 Claims**




1. A burner for burning a fuel medium or for oxidising or thermally treating a chemical medium including means forming at least one inner passage for conveying a stream of the fuel medium or chemical medium to a combustion zone created by the burner in operation thereof; means forming at least one outer passage for conveying a combustion-supporting gas to the combustion zone; and a jacket intermediate said inner and outer passages, and surrounding said inner passage along at least part of its length, means for placing a space between said inner passageway and jacket at a predetermined set pressure, and means for detecting a change in the pressure in said space.

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**4,591,332**

## CONTROL DEVICE OF A COMBUSTION APPARATUS

**Chuzoh Wada, Nara, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Sep. 25, 1984, Ser. No. 654,173**

**Claims priority, application Japan, Sep. 27, 1983, 58-178539; Sep. 27, 1983, 58-178540; Oct. 24, 1983, 58-164424**

**Int. Cl.[4] F23N** *5/00*

**U.S. Cl. 431—62** **9 Claims**

1. A control device of a combustion apparatus comprising:

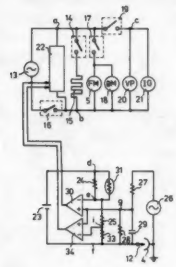
an alternating power source for impressing a voltage between a burner and a flame rod through a parallel circuit of a capacitor and a resistance,

a reference voltage producing circuit for producing a reference voltage,

an operational amplifier for inputting said reference voltage and the voltage of said capacitor, and comparing said two voltages, thereby to detect an unusual state of the combustion and to issue an unusual signal to a control circuit of the combustion apparatus,

a thermo sensitive element connected to one of said parallel

circuit and said reference voltage producing circuit, for varying the respective voltage of one of said capacitor and



said reference voltage according to an atmosphere temperature of air supplied to said burner.

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**4,591,333**

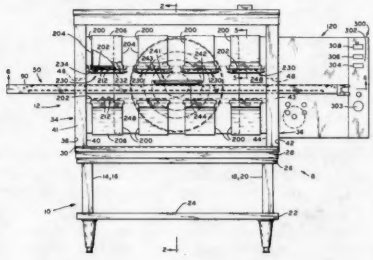
**IMPINGEMENT OVEN WITH RADIANT PANEL**

**Mitchell C. Henke, Fort Wayne, Ind., assignor to Lincoln Manufacturing Company, Inc., Fort Wayne, Ind.**

**Filed Mar. 26, 1985, Ser. No. 716,339**

**Int. Cl.[4] F27D** *5/00;* **F27B** *9/00;* **A23L** *3/00;* **A21B** *1/00*

**U.S. Cl. 432—10** **25 Claims**



23. A method for preparing a food product comprising:

providing an enclosure for receiving the food product;

supporting said food product in said enclosure;

heating a first surface of said food product with an impingement heating means, said impingement heating means impinging columnated jets of heated air upon localized areas of said first surface; and

heating a second surface of said food product with a radiant heating means.

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**4,591,334**

**FLUIDIZATION AID**

**Edward F. Brooks, Hermosa Beach, Calif., assignor to TRW Inc., Redondo Beach, Calif.**

**Continuation-in-part of Ser. No. 620,996, Jun. 15, 1984, which is a continuation-in-part of Ser. No. 339,778, Jan. 15, 1982, abandoned, which is a continuation of Ser. No. 188,201, Sep. 18, 1980, abandoned. This application Dec. 20, 1984, Ser. No. 684,424**

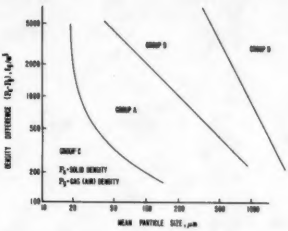
**Int. Cl.[4] F27B** *15/00;* **F26B** *3/08;* **C10G** *35/00;* **B01J** *23/00*

**U.S. Cl. 432—15** **37 Claims**

12. A composition suitable for fluidization in a mixed fluidized bed comprising:

(a) a particulate solid having a mean particle size of from 0.1 to 200 microns and a particle density of from 0.1 to 8 g/cm$^3$; and

(b) tendrillar carbonaceous material having a bulk density of from about 0.04 to about 0.7 g/cm$^3$ and comprising an agglomeration of tendrils having a diameter of from about




0.01 to about 1 micron and a length to diameter ratio of from about 5:1 to about 1000:1.

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**4,591,335**

**PROCESS FOR REHEATING AND CONVEYING A GRANULAR HEAT CARRIER**

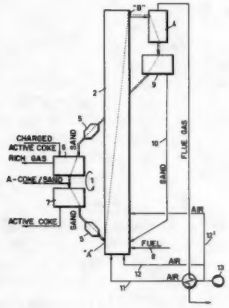
**Ludwig M. Buxel, Waltrop; Ludwig Mühlhaus, Nothweg, and Ulrich Neumann, Dortmund, all of Fed. Rep. of Germany, assignors to Uhde GmbH, Dortmund, Fed. Rep. of Germany**

**Filed Sep. 8, 1983, Ser. No. 530,208**

**Claims priority, application Fed. Rep. of Germany, Sep. 10, 1982, 3233533**

**Int. Cl.[4] F27B** *15/00;* **F26B** *3/08*

**U.S. Cl. 432—15** **1 Claim**



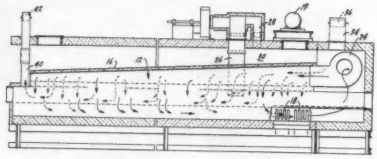

1. Proces for reheating and conveying a granular heat carrier transportable by gas for desorption by heating a charged lumpy adsorbent, such as activated carbon pellets, comprising introducing a fine sand of essentially uniform grain size as the heat carrier at a temperature greater than 400° C. into the lower part of a vertically extending laterally enclosed space so that a bed formed only of the fine sand is located within that enclosed space, introducing the gas into the lower end of the space, fluidizing the sand by means of the gas and forming the bed of sand into a highly expanded circulating fluidized bed moving upwardly through the enclosed space with the fluidizing effect of the gas being sufficient to discharge the sand from the upper end of the space, introducing fuel into the lower third of the enclosed space and providing combustion of the fuel in the fluidized bed for heating the heat carrier during its upward passage through the fluidized bed so that the sand is in the range of 700°–850° C. when it is discharged from the upper end of the space.

**4,591,336**

## OVEN FOR CURING RESIN-COATED WIRES

**Ronald L. Konczalski, Grosse Ile, Mich., assignor to Moco Thermal Industries, Rumulus, Mich.**

**Filed Apr. 19, 1984, Ser. No. 601,943**
**Int. Cl.[4] F27B *9/28***
**U.S. Cl. 432—59** **6 Claims**



1. In an oven having an elongated housing through which electrical conductor wires are to be fed, the wires having an insulator resin powder adherent thereto as a covering which is to be heated and cured inside the oven to become part of the wire configuration:

a plurality of laterally spaced elongated wire-treating chambers inside the oven parallel to the long axis of the oven, each chamber being insulated by a barrier from the adjacent chamber and assigned to the passage and treatment of an individual wire;

separate heating means for each chamber disposed therebeneath for heating and curing the resin cover on each wire;

each wire chamber being so constructed that heated air may pass therethrough to effect curing of the resin cover on the associated wire, and fan means for circulating the heated air through each wire-treating chamber;

individual cooling air inlet ducts, each normally closed by a damper, in communication with said fan means for selectively admitting a draft of forced ambient air to a wire chamber for cooling that chamber upon opening the related damper in the event the wire in that chamber should fail to feed;

individual cooling air exhaust ducts each in communication with a related wire-treating chamber and each exhaust duct being normally closed by a damper;

whereby upon failure to feed a wire properly the wire not being fed may be cooled by opening the related inlet and exhaust ducts while disabling the related heating means and continuing operation of the fan means.

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**4,591,337**

## HEAT TREATMENT FURNACE WITH CROWN-SHAPED TRANSPORT PATH FOR THE WORKPIECES

**Horst Gillhaus, Dortmund, Fed. Rep. of Germany, assignor to Ruhrgas Aktiengesellschaft, Fed. Rep. of Germany**

**PCT No. PCT/EP83/00336, § 371 Date Aug. 15, 1984, § 102(e) Date Aug. 15, 1984, PCT Pub. No. WO84/02390, PCT Pub. Date Jun. 21, 1984**
**PCT Filed Dec. 14, 1983, Ser. No. 641,948**
**Claims priority, application Fed. Rep. of Germany, Dec. 15, 1982, 3246371**
**Int. Cl.[4] F27B *9/16;* F27D *3/00;* F26B *15/26***
**U.S. Cl. 432—138** **49 Claims**

1. A furnace for heating workpieces comprising:

a furnace chamber having a vertical central axis;

means for charging and discharging the workpiece to and from said furnace chamber;

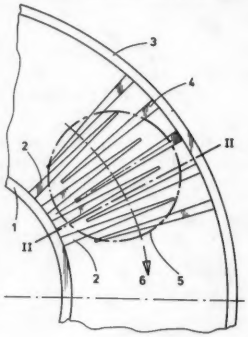
conveyor means arranged substantially concentrically with respect to said axis, for conveying the workpieces within at least a portion of said furnace chamber;

said conveyor means comprising a first group and a second group of radially extending open ended workpiece support elements, said first group of support elements being movable relative to said second group of support elements in substantially vertical directions parallel with respect to said axis and in substantially circular directions concentric with respect to said axis such that said relative movement provides step wise travel of the workpiece in a direction of travel concentric with said axis, the workpiece being supported alternately by said first and said second group of support elements at alternating points of engagement along the bottom suface of the workpieces;

said conveyor means having radially separated inner and outer portions;

first mounting means for supporting said first group of support elements and second mounting means for supporting said second group of support elements;

said first group of support elements being mounted on said first mounting means along said inner portion of said conveyor means and said second group of support elements being mounted on said second mounting means along said outer portion of said conveyor means;




at least one of said mounting means being movable to provide said relative movement between said groups of said support elements; and

said relative movement being defined by first vertical relative movement between said first and said second groups of support elements, second lateral relative movement along a circular path of travel relative to said axis between said first and said second group of support elements, and third vertical movement between said first and said second groups of support elements such that each element of one of said groups is raised above and lowered below at least one element of the other of said groups and further such that said each element passes at both sides laterally of said at least one element in a closed loop during one cycle of said relative movement between said first and said second groups of said support elements.

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**4,591,338**

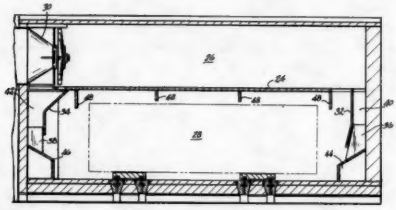
## PUSHER FURNACE

**Yogeshwar Sahai, Worthington, Ohio, and Joseph A. Clumpner, Towne & Country, Mo., assignors to Swiss Aluminium Ltd., Chippis, Switzerland**

**Filed May 20, 1985, Ser. No. 736,127**
**Int. Cl.[4] F27B *3/22***
**U.S. Cl. 432—148** **1 Claim**

1. A furnace for preheating and homogenizing aluminum ingots prior to hot rolling comprising an elongated housing having a ceiling, a floor and a pair of side walls extending from said floor to said ceiling for defining a chamber; divider means substantially parallel with said floor and extending from side wall to side wall for dividing said chamber into an upper fan section and a lower ingot heating section; circulating means disposed in said fan section for feeding hot gases to said ingot heating section; and baffle means associated with said side walls for directing said hot gases toward the lower portion of said lower ingot heating section so as to cause said hot gases to flow between the ingots to be heated so as to contact the entire

side wall surfaces thereof thereby improving heating efficiency thus reducing the time required to heat the ingots to the homogenizing temperature, said baffle means comprises a first elongated portion spaced from at least one of said side walls and extending from said divider means toward said floor so as to define a flow passage between said first portion and said side



walls, a second elongated portion located beneath said first portion and extending from said at least one side wall toward said floor so as to form an acute angle with said at least one side wall so as to direct hot gases from said flow passage toward the ingots to be heated and a plurality of elongated flanges substantially parallel to said side walls and extending from the underside of said divider means toward said floor.

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**4,591,339**

**DEVICE FOR TREATING OF WORK PIECES WITH AN EXPLOSIVE GAS MIXTURE**

**Hans-Jürgen Conrad, Rutesheim, and Eberhard Pfeiffer, Reutlingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

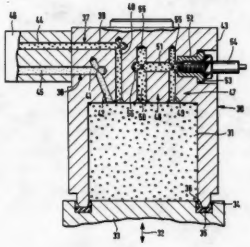
**PCT No. PCT/DE84/00096, § 371 Date Jan. 10, 1985, § 102(e) Date Jan. 10, 1985, PCT Pub. No. WO84/04715, PCT Pub. Date Dec. 6, 1984**

**PCT Filed Apr. 27, 1984, Ser. No. 700,876**

**Claims priority, application Fed. Rep. of Germany, May 20, 1983, 3318426**

**Int. Cl.[4] F27B** *5/04;* **C21D** *1/06;* **F23C** *11/04;* **F27D** *7/00*

**U.S. Cl. 432—205** **10 Claims**



1. A device for treating work pieces with an explosive gas mixture, comprising: a chamber block defining a work piece finishing chamber; an ignition device mounted in said chamber block; a gas deceleration stage located within said block between and communicating with said work piece finishing chamber and said ignition device; and a plurality of feeding lines provided in said block so as to feed gas mixture compounds immediately into said work piece finishing chamber.

**4,591,340**

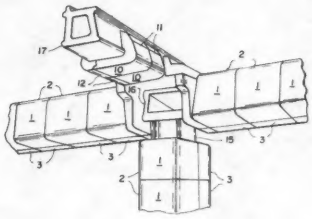
**REFRACTORY INSULATING SHIELDS FOR WATER-COOLED PIPES**

**Matthias R. Magera, R.D. #4, Box 13, McDonald, Pa. 15057**

**Filed May 24, 1984, Ser. No. 613,442**

**Int. Cl.[4] F27D** *3/02*

**U.S. Cl. 432—234** **4 Claims**



1. A refractory insulator in combination with a water-cooled pipe of substantially trapezoidal cross-section with projecting arcuate shoulders extending laterally outwardly from horizontal upper and lower ends thereof, said insulator closely surrounding at least the lower portion of said pipe and including two separate abutting parts connected together in a lower horizontal portion of said insulator adjacent one end of said lower horizontal portion of said insulator and a readily detachable means extending through said lower horizontal end of said insulator.

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**4,591,341**

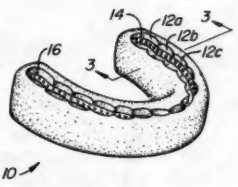
**ORTHODONTIC POSITIONER AND METHOD OF MANUFACTURING SAME**

**Lawrence F. Andrews, 2025 Chatsworth Blvd., San Diego, Calif. 92107**

**Filed Oct. 3, 1984, Ser. No. 657,308**

**Int. Cl.[4] A61C** *3/00*

**U.S. Cl. 433—6** **5 Claims**



1. An orthodontic positioner for urging at least one of a dental patient's teeth from an actual position to a desired position, the orthodontic positioner comprising:

a flexible mouthpiece formed to have therein impressions of the desired positions of the teeth; and

a tooth-adhering portion comprising a suction device interior of at least one of the impressions for grasping a selected tooth and urging the selected tooth from the actual position to the desired position with suction forces.

**4,591,342**

## VELOCITY-SIMULATOR FOR CONTROLLING THE RECIPROCAL MOVEMENTS OF PARTS OF A LARGE CALIBER GUN BARREL

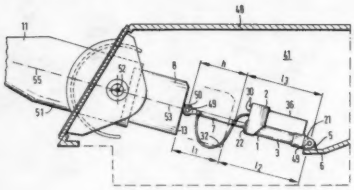
**Herbert Lipp, Duesseldorf, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany**

**Filed Dec. 6, 1984, Ser. No. 678,793**

**Claims priority, application Fed. Rep. of Germany, Dec. 17, 1983, 3345768**

**Int. Cl.[4] F41F *27/00***

**U.S. Cl. 434—18** **9 Claims**



1. An improved velocity simulator for controlling the movement of the recoil and counter-recoiling parts during the firing of a large caliber gun barrel with a piston cylinder unit filled with hydraulic medium by way of controllable valves, whose projecting piston rod of a differential piston on one side of the cylinder pulls backwards the recoil and counter-recoiling parts against the force of a barrel counter-recoil mechanism, the improvement comprising

(a) a control unit formed by three control valves which is joined in unit construction with a piston cylinder unit and which contains an additional valvel whereby the said control unit allows for the controlled movement of a variable velocity recoil and counter-recoil as well as the rapid counter-recoil corresponding to the maximum counter-recoil velocity and guarantees an arbitrary secured interruption,

(b) a control unit of the velocity simulator joined in unit construction with a unit piston cylinder unit which can be manually installed in a short period of time in a narrowly dimensioned installation space next to a gun barrel moving backward by a barrel recoil distance with an axial length remaining between the bottom member and a turret rim barrel recoil lengths on a gun barrel axis extended over and beyond a bottom member.

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**4,591,343**

## WALKER-SAILOR WATERCRAFT

**Peter H. Schaumann, 15 Jasmine La., Port St. Lucie, Fla. 33452**

**Filed Apr. 10, 1985, Ser. No. 721,760**

**Int. Cl.[4] A63C *15/03***

**U.S. Cl. 441—76** **18 Claims**

1. A walker-sailor watercraft which can be assembled for use in a walking mode or for use in a sailing mode, said walker-sailor watercraft comprising

(1) right and left walker members, each of said right and left walker members including a buoyant upper body, inner and outer keels extending downwardly from the upper body and a bottom plate extending between the inner and outer keels, each said upper body defining a top surface, a leading end, an outer side, a trailing end and an inner side, and each walker member including

a foot cavity extending downwardly from its top surface,

a support member connected to its top surface adjacent its inner side at a location between the foot cavity and the leading end,

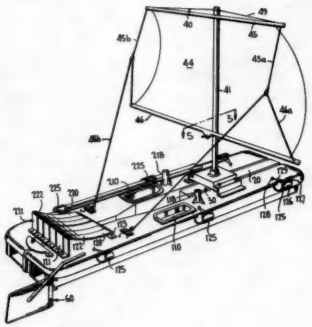
a hollow seat member connected to its top surface at a location between its foot cavity and its trailing end, and

storage means connected to its top surface adjacent its outer side,

the upper body of one of said right and left walker members including a rotatable latch and the upper body of the other of said right and left walker members including a cooperable post element,

the right walker member including at least one mounting bracket attached to the outer keel adjacent to the trailing end of the upper body thereof,

(2) a sail mounting platform which is fixedly positionable between the support members of said walker members, said mounting platform including means for mounting the lower end of a mast thereon and otherwise storable within the hollow seat member of one of said right and left walker members,



(3) a rudder structure which is removably positionable on the mounting bracket of said right walker member and otherwise storable with the hollow seat member of one of said right and left walker members, and

(4) a sail structure which is removably mountable on said sail mounting platform when said sail mounting platform is fixedly positioned between the support members of said walker members and otherwise storable in the storage means on one of said right and left walker members, said sail structure including a mast having a lower end mountable on said mounting platform and an upper end having support means, a boom and a sail.

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**4,591,344**

## METHOD OF FABRICATING A TENSION MASK COLOR CATHODE RAY TUBE

**Kazimir Palac, Carpentersville, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.**

**Division of Ser. No. 538,001, Sep. 30, 1983. This application Apr. 22, 1985, Ser. No. 725,724**

**Int. Cl.[4] H01J *9/30***

**U.S. Cl. 445—30** **3 Claims**

1. A method of making of color cathode ray tube utilizing a tension color selection electrode assembly as a stencil for screening a pattern of luminescent phosphor deposits upon a faceplate having a target area and a peripheral sealing area, and a plurality of registration-affording means at selected locations about the periphery of said faceplate, said faceplate being utilizable as a constituent of a color cathode ray tube, said electrode assembly comprising:

frame means defining a central opening dimensioned to enclose said target area and including a peripheral sealing area;

indexing means mechanically associated with said frame means and cooperate with said faceplate registration-affording means to facilitate multiple registered matings of said frame means and said faceplate during screening of said target area;

a planar tensed foil bonded to said frame means and having a predetermined pattern of apertures; and,

means for bonding said faceplate on said frame means such

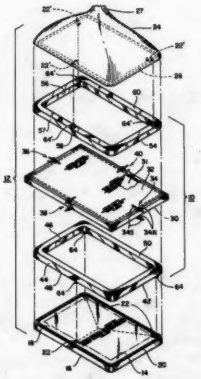
that said frame means become an integral part of the vacuum envelope for the tube during final assembly of the tube;

said method comprising:

(a) applying a photosensitve coating to said target area of said faceplate;

(b) registering said frame means with said faceplate to enable said foil to serve as a screen stencil by mating said registration-affording means and said indexing means;

(c) causing said coating to be exposed to radiation actinic thereto through the pattern of apertures in said foil such that the latent image of the pattern formed in the photosensitive coating corresponds with the pattern of electron beam landings on the target area where the tube is finally assembled and operating;



(d) removing said frame means;

(e) processing said exposed coating to establish a pattern of elemental phosphor deposits upon said target area corresponding to the latent image of the aperture pattern of said tensed foil;

(f) repeating steps (a) through (e) for each pattern of elemental phosphor deposits desired to be established;

(g) re-registering said frame means with said faceplate by mating said registration-affording means and said indexing means; and,

(h) sealing said faceplate sealing area to said frame means sealing area with said registration-affording means and said indexing means in mating registration, whereby said frame means becomes an integral constituent of said cathode ray tube.

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**4,591,345**

## CONFINED ANIMATION FIGURE TOY

**Michael Kohner, Parsippany, N.J., assignor to The Michael Kohner Corp., Parsippany, N.J.**

**Filed Dec. 14, 1984, Ser. No. 681,787**

**Int. Cl.[4] A63H** *3/20*

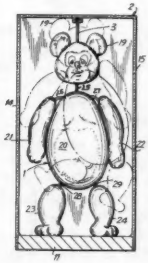
**U.S. Cl. 446—361** **1 Claim**

1. A closely confined animation toy comprising:

a housing including a plurality of walls collectively bounding an internal chamber, at least a part of at least one of said walls being transparent to enable a user of said toy to observe the interior of said housing and its contents;

an elongated operating element mounted on said housing for movement and having a flexible suspension portion extending into said internal chamber through a top one of said walls as considered in the position of use of the toy and an actuation portion located exteriorly of said housing; and

an animation figure accommodated in said internal chamber of said housing and having a plurality of connected parts displaceable with respect to one another, said parts including a torso, a head above and connected to the torso by a flexible elongated connector, and a plurality of limbs being connected to said torso by additional flexible elongated connectors, said figure being suspended from said suspension portion of said operating element for movement in response to the movement of the latter between a rest position in which said figure assumes a substantially erect position and a plurality of animated positions with attendant displacement of said parts with respect to one another to simulate voluntary body movements, the improvement comprising:



said suspension portion being constructed as a single flexible element connected to said head of said figure wherein a movement of said elongated operating element imparts a direct movement to said head, said walls of said housing being located in a close confronting adjacent relationship with said figure whereby a movement of said figure will result in said parts thereof randomly striking said walls, said striking of said walls thus operating to impart additional random movement to said figure which would not otherwise be accomplished due to the fact that no additional flexible operating elements are employed to move the limbs thereof, all such movement realized by asid figure thus being imparted thereto by a movement of the suspension element attached to said head and the striking of the parts of said figure against said walls.

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**4,591,346**

## SELF-RIGHTING VEHICLE WITH MEANS FOR LOCKING DRIVE WHEEL

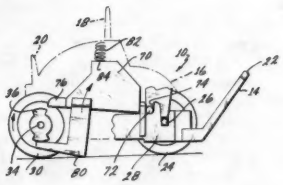
**Masaki Ikeda, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan**

**Filed May 14, 1984, Ser. No. 610,022**

**Claims priority, application Japan, Oct. 21, 1983, 58-162926[U]**

**Int. Cl.[4] A63H** *17/00, 29/24*

**U.S. Cl. 446—437** **3 Claims**



1. A toy vehicle which comprises:

a vehicle chassis;

a front axle having a pair of front wheels mounted thereon, said front axle being rotatably mounted on said chassis;
a rear axle having a pair of rear wheels located thereon, said rear axle being rotatably mounted on said chassis, at least one of said rear wheels comprising a driving wheel;
at least a portion of each of said wheels extending below said vehicle chassis to support said chassis above a surface with said chassis rolling on said wheels over said surface;
a windup motor mounted on said chassis, said motor being operatively connected to said drive wheel to rotate said drive wheel;
a detent member operatively associated with said drive wheel, said detent member being fixed to said drive wheel for rotation therewith;
an engaging member having an axle, said engaging member being pivotally mounted on said chassis about its axle so as to pivot on said chassis;
said engaging member including an engaging tooth and a surface contact arm, said engaging tooth being located in operative association with said detent member in a position above said rear axle, said surface contact arm located so as to extend downward from said chassis toward said surface;
a vehicle body attached to said vehicle chassis, said vehicle including a front bumper, said front bumper extending upwardly and outwardly of said body at an angle to said vehicle chassis and being shaped to form means whereby as said vehicle rolls on said wheels over said support surface if said front bumper strikes a relatively vertically extending surface of an abutment in the path of said vehicle as said vehicle rolls, said bumper interacts with said surface so as to lift the front of said vehicle upwardly to flip said vehicle;
said vehicle body further including at least one surface means located thereon, said surface means including a peripheral surface shaped so as to allow said toy to roll about said peripheral surface whereby if said toy is inverted on a supporting surface, said toy rolls about said peripheral surface from an inverted position to an upright position;
said engaging tooth on said engaging member locking with said detent member on said drive wheel so as to lock said drive wheel when said vehicle is in said inverted position.

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**4,591,347**

## WHEELED MINIATURE TOY VEHICLE WITH CONTROL ELEMENT THAT IS SQUEEZE-OPERATED AT SIDES

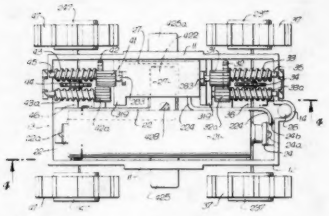
**Adolph E. Goldfarb, 4614 Monarca Dr., Tarzana, Calif. 91356; Delmar K. Everitt, Woodland Hills, and Norman J. Burger, Pacoima, both of Calif., assignors to Adolph E. Goldfarb, Northridge, Calif.**

**Continuation of Ser. No. 438,510, Nov. 2, 1982, Pat. No. 4,511,343, which is a continuation-in-part of Ser. No. 417,554, Sep. 13, 1982, Pat. No. 4,492,058, which is a continuation-in-part of Ser. No. 233,495, Feb. 11, 1981, abandoned, which is a continuation-in-part of Ser. No. 121,645, Feb. 14, 1980, Pat. No. 4,306,375. This application Dec. 12, 1984, Ser. No. 665,284**

**Int. Cl.[4] A63H** *29/02, 29/22*

**U.S. Cl. 446—462** **16 Claims**

1. In an electrical-battery-powdered mechanical toy vehicle for self-powered forward motion, the combination of:
a chassis having left and right sides;
a drive mechanism, mounted to the chassis, that controls operation of the toy vehicle;
a shifting element comprising an extended member that has two ends, and that is disposed for motion between:
at least one stable position in which one of the two ends extends toward one of the said sides of the chassis, at least to a position where it is accessible at that side and is there transversely manipulable by finger pressure applied thereto, said one position corresponding to self-powered forward motion of the vehicle, and
at least one other stable position in which the opposite of the two ends extends toward the other side of the chassis, at least to a position where it is accessible at that side and is there transversely manipulable by finger pressure applied thereto;
the shifting element being responsive to manipulation when it is in either position, to move it toward the other position, whereby such electrical battery can power the mechanism when the shifting element is in said one position; and
front and rear wheels, mounted for rotation at both the left and right sides of the chassis, and protruding from the chassis respectively forwardly and rearwardly of the shifting element to guard the respective ends of the shifting element against contact with nearby objects.



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**4,591,348**

## DAMPER DISC WITH SELF-ALIGNING SPRING SEATS

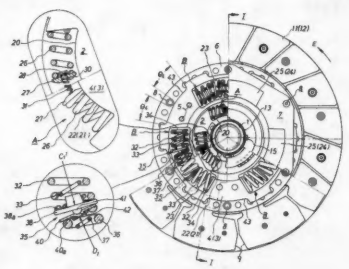
**Hiroshi Takeuchi, Higashi-Osaka, and Toru Hamada, Takatsuki, both of Japan, assignors to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan**

**Filed Dec. 28, 1984, Ser. No. 687,569**

**Claims priority, application Japan, Jan. 5, 1984, 59-309[U]**

**Int. Cl.[4] F16D** *3/14*

**U.S. Cl. 464—64** **12 Claims**



1. A damper disc comprising:
an input member adapted to be connected to a torque input part to coaxially rotate therewith, including an opening;
an output member adapted to be connected to an output shaft to rotate coaxially to the input member, including an opening;
spring mechanisms disposed in the openings of the input member and the output member to circumferentially connect the input member and the output member;
said spring mechanisms including a plurality of torsion springs disposed in series and a spring seat unit interposed between adjacent torsion springs, both ends of each spring mechanism being connected to the input and output members, said spring seat unit including
a first spring seat to which one of the adjacent torsion springs is seated,
a second spring seat to which the other of the adjacent torsion springs is seated and

a connecting means for connecting both spring seats together so that both spring seats can change their orientation with respect to the radial direction of the disc.

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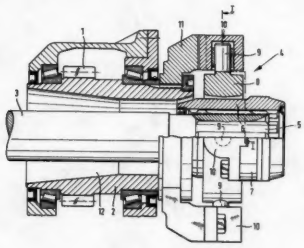
**4,591,349**

## CARDAN SHAFT DRIVE FOR A TRANSMISSION, PARTICULARLY FOR THE DISTRIBUTION TRANSMISSION OF A MOTOR VEHICLE WITH ALL-WHEEL DRIVE

**Hugo Lenhard-Backhaus, and Erhard Kauer, both of Österreich, Austria, assignors to Steyr-Daimler-Puch Aktiengesellschaft, Vienna, Austria**

**Filed Jun. 15, 1984, Ser. No. 620,895**
**Claims priority, application Austria, Jun. 15, 1983, 2206/83**
**Int. Cl.⁴ F16D** *3/06, 3/26*
**U.S. Cl. 464—136** **2 Claims**



**1.** In a universal joint transmission for use in connection with a distributor gear drive,

in combination,

a drive shaft of unitary construction,

a universal joint in driving engagement with said drive shaft, said universal joint including a driving member, a driven member and a universal joint coupling means therebetween,

said driven member comprising a hub revoluble about a rotational axis and being hollow on the interior and open at both axial ends and having on the exterior a portion circumferential about said axis;

said coupling means comprising a ring, surrounding with its inner circumference said driving member and defining therewith a clearance gap, said ring having four projecting radial studs equally spaced around its outer circumference, thereby comprising a first and second pair of radially opposed projecting radial studs;

said driving member comprising a sleeve-like hub passing through the center of said ring defining therewith said clearance gap, said sleeve-like hub being in longitudinally movable and rotational driving engagement with said driving shaft whose end is received within said sleeve-like hub;

said driven member and said driving member being on opposite sides of said coupling means;

said driven member, said distributor gear drive, and said drive shaft being on the same side of said coupling means;

a first pair of radially opposed pedestals, fastened to said sleeve-like hub and adapted to rotationally engage said first radially opposed pair of said projecting radial studs, whereby a driving torque is transmitted from said sleeve-like hub to said ring;

a second pair of radially opposed pedestals, fastened to said portion of said driven member and adapted to rotationally engage said second radially opposed pair of said projecting radial studs, whereby a driving torque is transmitted from said ring to said driven member;

said distributor gear drive comprising a driving gear including a hollow revoluble gear hub in driving connection with said hub of said driven member, the interiors of both said hubs being adjacent to, and communicating with, each other, and said driving shaft passing through the interiors of said hubs; and

the interior of said gear hub defining a bore widening conically away from said universal joint.

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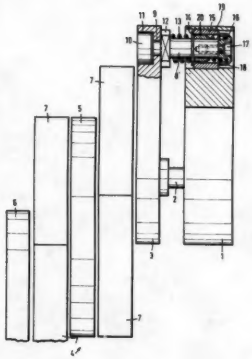
**4,591,350**

## COMPENSATOR COUPLING

**Manfred Obermeier, Apelnstedt, Fed. Rep. of Germany, assignor to Inkoma, Cremlingen, Fed. Rep. of Germany**

**Filed Apr. 6, 1984, Ser. No. 597,756**
**Claims priority, application Fed. Rep. of Germany, Apr. 9, 1983, 3312825**
**Int. Cl.⁴ F16D** *3/48*
**U.S. Cl. 464—138** **12 Claims**



**1.** A compensating coupling comprising at least two flanges, one of said flanges being connected with a rotating drive member and the other with a rotating driven member; and

a plurality of bolt members connecting said flanges, and for transmitting torque from the drive member to the driven member, wherein each of said bolt members includes a journal fastened to one of the two flanges, a sleeve having a cylindrical inner surface fastened to the other flange, a spherical ring having an axially convex surface, wherein the spherical ring is mounted on the journal for movement axially along the journal and mounted within said sleeve for movement axially along the inner surface of the sleeve, and at least a first compression spring biasing the spherical ring into an initial position.

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**4,591,351**

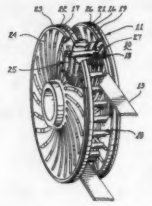
## VARIABLE RATIO PULLEYS FOR FLAT BELT TRANSMISSION SYSTEM

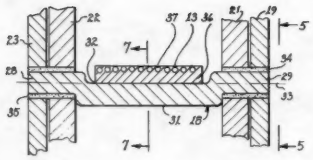
**Emerson L. Kumm, 1035 E. Laguna Dr., Tempe, Ariz. 85282**

**Filed Jun. 7, 1985, Ser. No. 742,322**
**Int. Cl.⁴ F16H** *55/54, 11/02*
**U.S. Cl. 474—49** **11 Claims**

**1.** In a variable diameter pulley belt drive wherein a pair of pulley sheaves support a series of drive elements between them and a drive belt engages a drive surface on such drive elements, a drive element comprising a central shank, a first bearing member at one end of said central shank and a second bearing member at the other end of said central shank, said central shank having a bearing surface against which a drive belt bears, said first bearing member being adapted to be received in one location in one of said pair of pulley sheaves, said second bearing member being adapted to be received in one location

of the other of said pair of pulley sheaves, the center line of said first and said second of said bearing members defining a drive





line, the bearing surface of said central shank being disposed to said drive line.

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**4,591,352**

## TENSION ROLLER

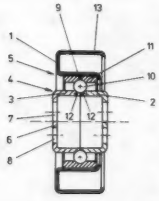
**Armin Olschewski, Schweinfurt; Manfred Brandenstein, Eussenheim; Lothar Walter, Schweinfurt, and Horst M. Ernst, Eltingshausen, all of Fed. Rep. of Germany, assignors to SKF Kugellagerfabriken GmbH, Schweinfurt, Fed. Rep. of Germany**

**Filed May 18, 1981, Ser. No. 265,033**

**Claims priority, application Fed. Rep. of Germany, May 16, 1980, 8013203[U]**

**Int. Cl.⁴ F16H *55/12***

**U.S. Cl. 474—95** **9 Claims**



**1**. In a tension roller for a belt drive comprising a roller member, said roller member being supported on a hollow support body by means of an intermediate rolling bearing, the hollow support body having a pair of aligned eccentric mounting holes for receiving mounting means, the improvement wherein the hollow support body comprises a pair of substantially identical hollow pot-shaped members having oppositely directed open sides and bottoms, each of said bottoms having one of said eccentric mounting holes for eccentrically mounting the hollow members on said mounting means.

**4,591,353**

## LINK BELT FOR AN INFINITELY VARIABLE TRANSMISSION INCLUDING CONE DISKS LOOPED BY A FLEXIBLE BELT

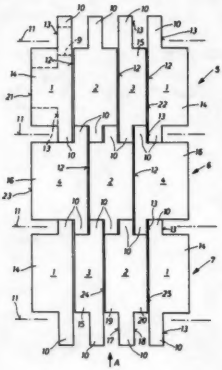
**Reinhold F. Reber, 1120 E. Shore Dr., Ithaca, N.Y. 14850**

**Filed Nov. 15, 1984, Ser. No. 671,630**

**Claims priority, application Switzerland, Nov. 15, 1983, 6163/83**

**Int. Cl.⁴ F16G *1/21***

**U.S. Cl. 474—245** **16 Claims**



**1**. A link belt for an infinitely variable transmission including cone disks looped by a flexible belt, which link belt is provided with a plurality of link members and a plurality of pivot pins which pivotably interconnect adjacent link members, and is provided further with thrust surfaces located intermediate of respective pivot pins and operative to transmit frictional forces, in which each link member mounted to two adjacent pivot pins comprises a plurality of link member disks, each provided with tongues having through bores in which the pivot pins are received, and comprises further at least one anvil-shaped projection arranged between said through bores and which projects away from the plane of the disk and includes one of said thrust surfaces.

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**4,591,354**

## APPARATUS FOR FOLDING SHEET MATERIALS

**Edward Gelbard, Monte Carlo, Monaco, assignor to Wilverly Mansions I.B.V., Netherlands**

**Filed Aug. 15, 1984, Ser. No. 640,933**

**Int. Cl.⁴ B31F *1/00***

**U.S. Cl. 493—439** **16 Claims**

**10**. A method of effecting a widthwise folding of a long, flexible web, comprising the steps of

training said web about first elongated training means at a first location before said folding,

training said web about second elongated training means at a second location spaced apart from said first location after said folding,

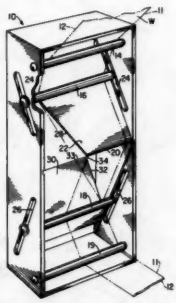
training a portion of said web about a fixed displacement means at a fixed location equidistant from said first and second training means during said folding, said fixed displacement means comprising a fixed folding edge parallel to the axes of said first and second training means and spaced a predetermined distance from the plane in which said axes lie, said predetermined distance being approximately equal to the width of the folded film, with one end of said folding edge terminating at a point corresponding to the desired fold line of the web such that:

a first triangle is defined by a first point where a first edge of said web intersects said first training means, a second point where the same edge of said web intersects said second

training means, and a third point where the opposite edge of said web intersects said first training means,

a second triangle is defined by said first point, a fourth point where said first edge of said web intersects said displacement means, and a fifth point midway between said first and second point, and

a third triangle is defined by said second, fourth and fifth points,



said triangles being similar and the distance between said fourth and fifth points being half the distance between said first and third points, and

accommodating webs of different widths by adjusting the positions of said first and second training means without changing the shapes of said triangles or moving said folding edge.

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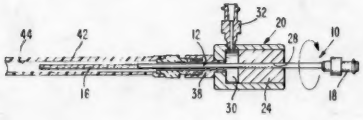
**4,591,355**

## CLOSE CLEARANCE SEAL FOR ROTATABLE THERAPEUTIC CATHETERS

**Gernot R. K. Hilse, Woodinville, Wash., assignor to Advanced Technology Laboratories, Inc., Bothell, Wash.**

**Filed Jun. 27, 1984, Ser. No. 625,074**
**Int. Cl.[4] A61M *5/18***
**U.S. Cl. 604—159** **9 Claims**



**1.** A close clearance fluid and gas seal for use with motor drive therapeutic catheters comprising:

(a) a drive shaft including an elongated, cylindrical portion having motor connection means at one end, said elongated cylindrical, portion having a first outside diameter, said drive shaft further comprising a flexible catheter attached at the end remote from the end having said motor connection means; and

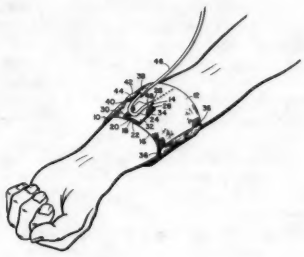
(b) a bushing having a cylindrical opening formed therethrough, said cylindrical opening being formed to have an inside diameter which is substantially the same, but slightly more than, said first outside diameter.

**4,591,356**

## INTRAVENOUS NEEDLE STABILIZING BAND

**Barbara C. Christie, 3096 Westwood Way, Alpharetta, Ga. 30201**

**Filed Jun. 6, 1984, Ser. No. 617,894**
**Int. Cl.[4] B61M *5/32***
**U.S. Cl. 604—179** **9 Claims**



**1.** An easily changed non-skin-adhesive band for stabilizing an intravenous needle inserted in a patient's vein on a limb of the patient comprising:

a longitudinal flexible strip having ends connectable together, said strip having a hole in the body thereof and being cut laterally therethrough from said hole to the side edge of said strip to form a slit, said hole sized to fit closely about the intravenous needle;

a second flexible strip having one end thereof fixed to said longitudinal strip adjacent one side of said cut, and the other end of said second strip being free to extend said second strip over said cut so as to close the slit, whereby an intravenous needle may be first inserted into the patient and thereafter stablized by attaching the band by positioning the hole of the strip on the needle portion entering the skin, passing the needle and attached tube through the slit, thereafter overlapping the second strip to close said slit and surround and stablize the needle with the longitudinal flexible strip wrapped around the limb and its ends secured together, and whereby the stabilizer may be thereafter easily changed without removal of or disturbance of the needle.

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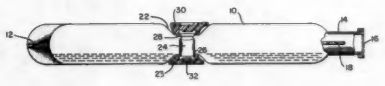
**4,591,357**

## CONTAINER FOR DRUG ISOLATION, STORAGE AND SUBSEQUENT MIXING

**Vincent R. Sneider, 3422 Hallcrest Dr., Atlanta, Ga. 30319**

**Filed Sep. 27, 1985, Ser. No. 780,997**
**Int. Cl.[4] B65D *30/22*; A61M *5/00***
**U.S. Cl. 604—416** **20 Claims**



**1.** A drug-mixing device having an envelope adapted to receive and retain a determined quantity of diluent, said device adapted for isolation of the drug components during preparation, transporting, storage and, when mixing is desired, a manipulation and pulling is required to open a drug concentrate container for mixing of the contents of the envelope, after which withdrawal of the mixed drug from the envelope is made, this drug mixing device including:

(a) an envelope in which a desired quantity of a diluent is contained and in which at least upper and lower midportions of said envelope are of flexible material which is manipulable without rupture, said envelope substantially

impervious to unwanted escape or seepage from said envelope of a fluid diluent retained therein;

(b) a fluid input and output fluid-conducting pathway member provided and secured to said envelope, said fluid-conducting path member adapted for carrying fluid to and from the envelope;

(c) a drug concentrate container carried within said envelope and of substantially rigid material and with said container having an open neck portion having means for retaining a removable cap member when seated thereon, said container having at or adjacent the closed end thereof an outwardly-extending ring portion and with an orienting means formed in the end of this container, this container end portion providing means for remotely grasping and providing controlled rotational movement of said container;

(d) a resilient cap or stopper carrier within said envelope, said cap having a retaining means when said cap is mounted on the neck of the concentrate container and when so mounted to retain the concentrate in an isolated and unmixed condition until said cap is removed from the container, said cap having an outwardly-extending retaining ring and having the outward end portion of said cap formed with orienting means, said ring and orienting means providing for controlled grasping, manipulation and rotational movement of said cap;

(e) a lower pull tab member that is partially resilient and formed so the lower portion of the concentrate container, the outwardly-extending ring portion and the orienting means therein when brought to a lower extent of the flexible midportion of the envelope are secured therebetween and the flexible midportion is retained absent rupture, and

(f) an upper pull tab member that is partially resilient and is so formed that the formed cap with its outwardly-extending ring portion and the orienting means therein, when brought to the upper extent of the flexible midportion of the envelope and inserted into this upper grip member, said flexible midportion of the envelope is secured therebetween and is retained absent rupture, the upper and lower pull tab members manipulated so that the resilient cap member is loosened and tipped so that said cap is removed with the upper and lower flexible midportions fluid-tight, and with the cap removed the concentrate content are brought in way of the diluent in the envelope whereat mixing is achieved by shaking and the like, after which the mixed drug is removed from the container for use in a patient.

**4,591,358**

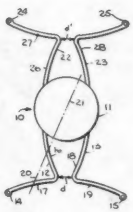
## INTRAOCULAR LENS

**Charles D. Kelman, North Shore Towers, 269 Grand Central Pkwy., Floral Park, N.Y. 11005**

**Filed Mar. 31, 1983, Ser. No. 480,836**

**Int. Cl.[4] A61F *2/16***

**U.S. Cl. 623—6** **9 Claims**



1. An intraocular lens suitable for use as an artificial lens in the interior of a human eye comprising:

a light-focusing lens body;

first and second position fixation means individually joined to said lens body and extending outwardly from said lens body for seating in interior portions of an eye;

said first and second position-fixation means each having a single contact portion adapted to make substantially a single contact point with an interior portion of an eye, said first and second position-fixation means individually including portions extending from said lens body to said individual contact portions generally in at least two predetermined opposite senses with respect to said lens body to provide resilience of said contact portions with respect to said lens body; said portions of said first position-fixation means which extend from said lens body to one of said contact portions extending sequentially in clockwise and counterclockwise senses with respect to said lens body, and said portions of said second position-fixation means which extend from said lens body to another of said contact portions extending sequentially in counterclockwise and clockwise senses with respect to said lens body; and

other position-fixation means joined to said lens body for positioning said lens body in the interior of the eye.

4,591,359

## PROCESS FOR PREPARING ACID NITRO DYESTUFFS FOR LEATHER

Hasso Hertel, Mulheim am Rheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Aug. 23, 1984, Ser. No. 643,840

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1983, 3330948

Int. Cl.[4] D06P *3/32;* C07C *87/50*

U.S. Cl. 8—436 18 Claims

1. In a process for preparing acid nitro dyestuffs by treating an aminonitrodiphenylaminesulfonic acid with an oxidizing agent in an aqueous medium, the improvement consisting of reacting the aminonitrodiphenylaminesulfonic acid with hypochlorous acid or an alkali metal or alkaline earth metal salt of hypochlorous acid as the oxidizing agent or a mixture of these compounds, and carrying out the reaction at above pH 4 and at a temperature between 0 and 100° C.

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4,591,360

## DECORATING METAL CAN CONTAINERS FROM FLEXIBLE TRANSFER PAPER CARRIER WHICH IS HEATED TO SHRINK ONTO CAN

Leonard A. Jenkins, Kirtlington, and Terence A. Turner, Frilford Heath, both of United Kingdom, assignors to Metal Box plc, United Kingdom

PCT No. PCT/GB84/00301, § 371 Date May 2, 1985, § 102(e) Date May 2, 1985, PCT Pub. No. WO85/01018, PCT Pub. Date Mar. 14, 1985

PCT Filed Aug. 30, 1984, Ser. No. 732,756

Claims priority, application United Kingdom, Sep. 2, 1983, 3323563

Int. Cl.[4] B41M *1/28;* B44C *1/17*

U.S. Cl. 8—471 8 Claims

1. A method of decorating tubular metal containers including the steps of:

(a) applying a flexible paper carrier, printed with indicia in a sublimible dye, over a coating receptive to such dye on a surface of the container, by means of an adhesive such as to be removable without damage to the coating, and

(b) heating the container whilst the carrier is held to it, at such a temperature and for such a time that the carrier freely shrinks into intimate contact with the coating and at least some of the dye sublimes so as to transfer the indicia to the coating.

in which the paper carrier has a weight of 35–110 grams per square meter, an equilibrium moisture content of 2–15% when exposed to air with a relative humidity of 50%, and is applied to the coating on the surface of the container so that the direction of grain of the paper is parallel to the axis of symmetry passing through the centre of the base of the container.

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4,591,361

## METHOD OF PRODUCING ACRYLONITRILE-BASE IN-LINE DYED FIBERS USING RAPIDLY ALTERNATING DYE SOLUTION CROSS FLOW

Giorgio Cazzaro, Saronno; Antonino Cavallaro; Gianfranco Casagrande, both of Cesano Maderno, and Gianmarco Del Felice, Monza, all of Italy, assignors to Snia Fibre S.p.A., Cesano Maderno, Italy

Filed Dec. 27, 1983, Ser. No. 566,176

Claims priority, application Italy, Dec. 31, 1982, 25076 A/82

Int. Cl.[4] D06P *3/60*

U.S. Cl. 8—538 4 Claims

1. In a wet spinning process of producing polyacrylonitrile-based fibers wherein a tow is dyed in a hydrated, gel-like condition, passing the fiber tow through a dyeing bath wherein alternating direction crossflows are directed through the tow transversely to the direction of travel of the fiber tow, the improvement comprising said passing is at an overall flow rate of up to 10 $cm^3$ per second per $cm^2$.

4,591,362

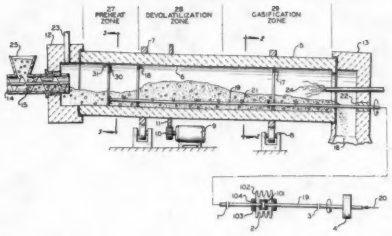
## FLUID INJECTION METHOD

Amos Yudovich, Tulsa, and George E. Hays, Bartlesville, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 6, 1984, Ser. No. 597,289

Int. Cl.[4] C10J *3/60*

U.S. Cl. 48—197 R 4 Claims




1. A process for gasifying solid carbonaceous material to yield gaseous products and solid residue comprising:

(1) introducing said carbonaceous material into an elongated, inclined rotating zone thereby forming a tumbling bed of said material,

(2) injecting a gasifying agent into said tumbling bed through outlets in an elongated, tubular flow path positioned and supported to remain in said tumbling bed by means attached to and rotating with said zone,

(3) maintaining said position of the tubular flow path relative to the rotating means of support by rotating the tubular flow path along said support means at a velocity such that no friction occurs therebetween,

(4) maintaining said tumbling bed at a temperature sufficient to produce gasified products from said carbonaceous material,

(5) recovering said gaseous products, and

(6) discharging said residue from said rotating zone.

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4,591,363

## PROCESS OF MAKING A COATED ABRASIVE FOR DIAMOND GRINDING WHEELS

Warren J. Silverman, 2516 Ave. S, Brooklyn, N.Y. 11229

Filed Jul. 31, 1985, Ser. No. 761,003

Int. Cl.[4] E02D *27/00*

U.S. Cl. 51—293 3 Claims

1. A process for the manufacture of a coated synthetic diamond grit abrasive for making diamond grinding wheels, which comprises moistening clean synthetic diamond grit with an aqueous wetting agent solution, adding to the moistened diamond grit a metal mixture consisting of about 70 percent deoxidized copper, about 20 percent tin and about 10 percent titanium hydride and about 10 percent of a metal hydride selected from the group consisting of titanium hydride, zirconium hydride and hafnium hydride in a ratio of up to about two parts metal mixture to one part diamond, adding to the resulting mixture about 10 percent by weight based on the weight of the diamond-metal mixture of a highly refractive and abrasive ceramic, filling the resulting composition into a compartmented stainless steel tray, heating the filled tray at about 960° C. in a furnace with an inert atmosphere to sinter said composition, cooling the sintered composition to below 150° C., crushing the cooled composition until the crushed material passes through a screen with a 2 to 4 times larger mesh than the original size of the diamond grit particles, and sieving the screened material on a screen with a mesh two sizes smaller than the original diamond grit.

4,591,364

## ABRASIVE MATERIALS

**Cornelius Phaal, 14 Robant Lane, Rivoniz, Sandton, Transvaal, South Africa**

**Continuation of Ser. No. 941,575, Sep. 12, 1978, Pat. No. 4,246,006. This application Sep. 5, 1980, Ser. No. 184,258**

**Claims priority, application South Africa, Sep. 12, 1977, 77/5458; Dec. 12, 1977, 77/7154; Dec. 12, 1977, 77/7156**

**The portion of the term of this patent subsequent to Jan. 20, 1998, has been disclaimed.**

**Int. Cl.[4] B24D** *3/06*

**U.S. Cl. 51—309** **29 Claims**

1. Aggregate diamond abrasive particles produced by the method comprising forming a mixture of diamond abrasive particles and a powdered metal, heating the mixture to sinter the metal followed by cooling to produce a mass and crushing the mass to obtain the aggregated particles, characterised in that the particles are selected from Types A, B and C, as hereinafter defined, and mixtures thereof:

Particles of Type A have the following characteristics:

1. A Friatest Index of about 70 to 90, for particles of size 74 to 88 microns;
2. A metal content of about 1.0 to 1.5 percent by weight;
3. Predominantly translucent colour with the occasional transparent white, grey and yellow particle;
4. Predominantly blocky shape tending towards elongate particles;
5. Predominantly rough and undulating surface;

Particles of Type B have the following characteristics:

1. Weak, having a Friatest Index of about 65 to 88, for particles of size 74 to 88 microns;
2. A metal content of greater than 2 percent by weight;
3. Predominantly dark in colour;
4. A blocky and irregular shape;
5. Rough with surface irregularities, re-entrant angles and etch pits;

Particles of Type C have the following characteristics:

1. Medium strength, having a Friatest Index in the range about 100 to 121 for particles of size 74 to 88 microns;
2. A metal content of less than 0.8 percent by weight;
3. Predominantly yellow in colour;
4. An angular to blocky shape with sharp edges;
5. A predominantly smooth surface.

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4,591,365

## SEMIPERMEABLE MEMBRANE GAS SEPARATION SYSTEM

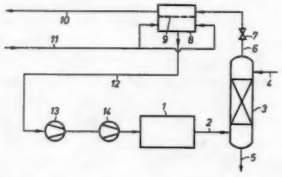
**Peter S. Burr, Munich, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany**

**Filed Oct. 15, 1984, Ser. No. 660,814**

**Claims priority, application Fed. Rep. of Germany, Oct. 15, 1983, 3337572**

**Int. Cl.[4] B01D** *53/22*

**U.S. Cl. 55—16** **5 Claims**



1. In a process for separating a more readily diffusing component from a gaseous mixture containing said readily diffusing component and at least one less readily diffusing component, by diffusion through a semipermeable membrane having an upstream barrier side and a downstream side, the improvement which comprises admixing to the gaseous mixture to be separated on the upstream barrier side about 2 to 25% of a gaseous component having a substantially higher rate of diffusion than said more readily diffusing component and diffusing resultant admixture, whereby the admixed gaseous component passes through the semipermeable membrane thereby lowering partial pressure of the more readily diffusing component on said passage side whereby the rate of diffission of the more readily diffused component is increased compared to a process wherein no admixture is conducted, wherein the gaseous mixture consists essentially of methane and carbon dioxide and the gaseous component admixed prior to diffusion is steam.

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4,591,366

## METHOD OF SUBSEQUENT TREATMENT OF SULFUR GAS FROM WASTE PYROLYSIS

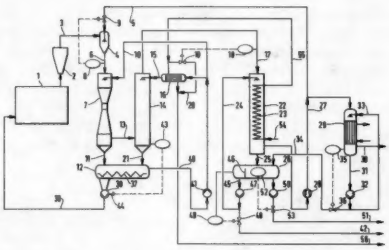
**Hans J. Wohner; Wilfried Pappmann, and Peter Diemer, all of Essen, Fed. Rep. of Germany, assignors to Krupp-Koppers GmbH, Essen, Fed. Rep. of Germany**

**Filed May 7, 1985, Ser. No. 731,478**

**Claims priority, application Fed. Rep. of Germany, Jun. 8, 1984, 3421393**

**Int. Cl.[4] B01D** *47/10*

**U.S. Cl. 55—20** **9 Claims**



1. A method of subsequent treatment of hydrocarbon containing sulfur gas obtained during pyrolysis of wastes containing organic substances, particularly of home garbage, comprising the steps of

(a) precooling a gas exiting a pyrolysis reactor after its hot dust removal to a gas temperature 200° C. and 350° C. with adjusting the gas temperature so that it lies above a dew point of higher boiling hydrocarbons contained in the gas;

(b) subjecting the gas after the precooling to a fine dust removal in a Venturi washer with addition of own condensate;

(c) cooling the dust-removed gas exiting the Venturi washer in a direct cooler in counterstream with the cooled own condensate to a temperature between 60° and 120° C. with adjusting the gas temperature so that it lies above a dew point of water vapor contained in the gas;

(d) cooling subsequently the gas in an indirect cooler to a gas outlet temperature of 20°–30° C. with simultaneous spraying of the same by the own condensate as a spraying medium;

(e) bringing the gas subsequently in an indirect final cooler to an end temperature of between 0° and 5° C. to supply the same to a further use or intermediate storing;

(f) drawing in a first separating container, components which are separated in the Venturi washer and the direct cooler from the gas and separating the components in the separating container into a heavy tar and a oil phase, with supplying the obtained oil containing heavy tar to a further conversion in the pyrolysis reactor and using the oil phase completely or partially as own condensate for gas treating in the Venturi washer and in the direct cooler; and

(g) drawing in a second separating container components separated in the indirect cooler from the gas and separat-

ing the same in the second separating container into a water and oil phase with directly discharging the separated water and using the oil phase completely or partially as own condensate for gas treating in the indirect cooler.

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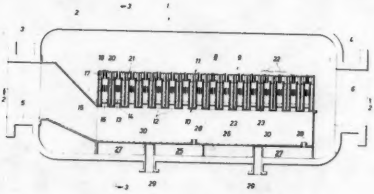
**4,591,367**

## HORIZONTAL GAS/LIQUID SEPARATOR

**Johan J. B. Pek, and Hubertus J. A. Schuurmans, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed Aug. 30, 1984, Ser. No. 646,282**
**Claims priority, application United Kingdom, Oct. 5, 1983, 8326664**
**Int. Cl.[4] B01D *45/12***
**U.S. Cl. 55—344** **10 Claims**



1. A horizontal gas/liquid separator comprising:
a cylindrical vessel having gas inlet and outlet openings;
a gas inlet channel and gas outlet channel being formed in said vessel and separated from one another by a horizontal gas/liquid separating zone extending over substantially the length of said vessel, said inlet and outlet channels being connected to said inlet and outlet openings respectively;
said gas/liquid separating zone being formed by upper and lower spaced horizontal tubesheets;
a plurality of swirl tubes, said swirl tubes being mounted in said lower tubesheet and extending upward, the lower ends of the swirl tubes communicating with said gas inlet channel and the upper ends of the swirl tubes terminating below said upper tubesheet;
a plurality of primary gas outlet tubes mounted in said upper tubesheet coaxial with said swirl tubes, the lower ends of said primary gas outlet tubes extending into said swirl tubes, the cross sectional area of said primary gas outlet tubes decreasing in the direction of said gas outlet to provide a substantially uniform distribution over said swirl tubes;
a plurality of vertical separating walls, said separating walls being secured to the upper tubesheet and extending downwardly to subdivide said separating zone into a plurality of compartments;
a liquid collecting zone having a liquid outlet, said liquid collecting zone being separated from said gas/liquid separating zone; and
a liquid withdrawal tube communicating with the lower portion of said gas/liquid separation zone and said liquid collecting zone.

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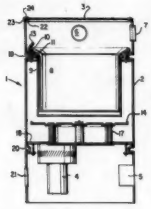
**4,591,368**

## BUILT-IN VACUUM SYSTEM

**James L. MacDuff, 1284 Montrose Ave., Victoria, B.C., V8T 2K6, Canada**

**Filed May 29, 1984, Ser. No. 614,679**
**Claims priority, application Canada, Apr. 27, 1984, 453061**
**Int. Cl.[4] B01D *25/02***
**U.S. Cl. 55—372** **13 Claims**

1. A built-in vacuum apparatus comprising in combination:
(a) a hollow container having in the walls thereof at least one air vacuum inlet prot and one air vacuum outlet port;
(b) air vacuum drawing means communicating with the inlet port and the outlet port for drawing a vacuum upon the vacuum inlet port, and exhausting drawn air through the vacuum outlet port;
(c) a first hollow open ended particle filtering medium which is open at one end and closed at the opposite end and is disposed within the container between the inlet port and the vacuum drawing means, the open end of the filtering medium facing in the direction of the inlet means, the filtering means being connected by a filtering means suspension means in an airtight manner with the side walls of the container;
(d) a second hollow open ended particle filtering medium which is open at one end and closed at the opposite end and is of slightly smaller dimensions than the first filtering medium, fits within the interior of the first filtering medium and has its open end facing in the same direction as



the open end of the first filtering medium, the first and second particle filtering mediums being so positioned within the container by the filtering means suspension means that none of the effective filtering surface of the first and second filtering mediums contacts the walls of the container when a vacuum is draw upon the system by the vacuum drawing means; and
(e) a hollow cylindrically shaped air filter open at one end and closed at the opposite end which is positioned within the interior of the container between the first and second filter mediums, and the vacuum drawing means, the open end facing in the direction of the vacuum drawing means, and air passes from the exterior of the filter mediums into the interior of the air filter through the sidewall of the filter before being drawn by the vacuum drawing means through the outlet port.

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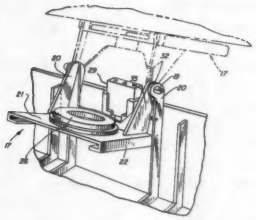
**4,591,369**

## DUST BAG MOUNT ARRANGEMENT FOR CANISTER VACUUM CLEANER

**Bruce E. Stewart, Sr., Maplewood, and John B. Lyman, Bloomington, both of Minn., assignors to Whirlpool Corporation, Benton Harbor, Mich.**

**Filed Oct. 24, 1984, Ser. No. 664,947**
**Int. Cl.[4] B01D *46/02***
**U.S. Cl. 55—374** **19 Claims**



1. In a vacuum cleaner canister having a base defining a filter bag space and an access opening to said space, and a hood

removably closing said access opening, the improvement comprising:

means for removably mounting a filter bag in said bag space comprising a bag mount carried by the base;

means for automatically positioning the bag mount (a) in a blocking disposition for preventing the closing of said access opening by said hood as an incident of the bag mount being free of a filter bag mounted thereto, and (b) in an operative disposition and concurrently permitting the closing of said access openings by said hood, said bag mount being caused to be automatically disposed in said operative position as an incident of the mounting of a filter bag to said bag mount and reception of said filter bag in said bag space; and

means on the hood defining an access opening aligned with the position of the bag mount in the operative disposition for permitting a suction hose end to be extended therethrough into removably connected association with said bag mount for delivering dirt-laden air to the filter bag.

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**4,591,370**

**CRYOGENIC PROCESS FOR REMOVING ACID GASES FROM GAS MIXTURES BY MEANS OF A SOLVENT**

**Luigi Gazzi; Roberto D'Ambra, both of Milan; Roberto Di Cintio; Carlo Rescalli, both of S.Donato Milanese, and Alessandro Vetere, Milan, all of Italy, assignors to Snamprogetti, S.p.A., Milan, Italy**

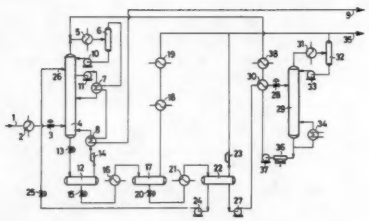
**Filed Dec. 27, 1983, Ser. No. 565,459**

**Claims priority, application Italy, Jan. 19, 1983, 19177 A/83**

**The portion of the term of this patent subsequent to Dec. 31, 2002, has been disclaimed.**

**Int. Cl.[4] F25J *3/02***

**U.S. Cl. 62—17** **45 Claims**



1. A process for removing acid gases from natural or synthesis gases comprising recovering a product which is essentially acid gas free from a feed material of natural or synthesis gases containing about 50 mole % or more of acid gases by the following steps:

(a) cooling the natural or synthesis gas to be purified sufficiently to condense part of the acid gases contained in said gas so that the acid gases which remain uncondensed do not exceed 30 mole % in the gaseous phase;

(b) selectively removing acid gases which remain uncondensed from the cooled and partly condensed gas in an absorption column with at least one regeneratable solvent having a high selectivity for said acid gases in order to produce said essentially acid gas free product; and

(c) regenerating the solvent or solvents used in the acid gas absorption;

the solvent used being selected from the group consisting of low molecular weight esters, alcohols and ethers.

**4,591,371**

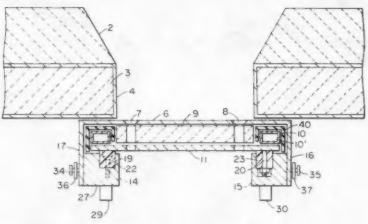
**GLASS FIBER FORMING BUSHING CONSTRUCTION**

**William L. Schaefer, Butler, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 741,377, Jun. 5, 1985, which is a continuation-in-part of Ser. No. 635,018, Jul. 27, 1984, abandoned. This application Sep. 5, 1985, Ser. No. 772,976**

**Int. Cl.[4] C03B *37/09***

**U.S. Cl. 65—1** **3 Claims**



1. In a fiber forming bushing, an electrical connection for supplying current to the bushing comprising a bus bar, means to mount said bus bar to a stud affixed to a bushing support at each end of said bushing, said mounting including a bolt traversing said stud, insulating means on both sides of said stud and in the interior of said stud to electrically insulate said bolt from said stud and the bushing support, means to clamp said bolt to a bushing connector and said bus bar and means to bias said connector and said insulating means against said bus bar.

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**4,591,372**

**SINGLE MODE FIBRE DIRECTIONAL COUPLER MANUFACTURE**

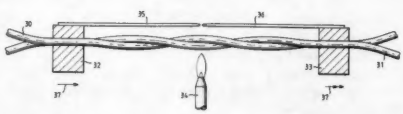
**Terry Bricheno, Great Sampford; Alan Fielding, and Nicholas A. Hewish, both of Harlow, all of England, assignors to Standard Telephones & Cables Public Ltd. Co., London, England**

**Filed Nov. 28, 1984, Ser. No. 675,559**

**Claims priority, application United Kingdom, Nov. 30, 1983, 8331950**

**Int. Cl.[4] C03B *23/04*; G02B *5/172***

**U.S. Cl. 65—4.2** **3 Claims**

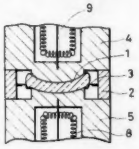


1. A method of making a single mode fibre directional coupler, wherein a plurality of glass single mode optical fibres held in side-by-side contact with each other are subjected to a plurality of progressive stretching operations to produce the requisite optical coupling strength between the fibres, in each of which operations the fibres are axially stretched at a controlled rate by moving two spaced ends on the fibres axially in the same direction relative to a heat source but at different speeds such that the leading end moves at a faster rate relative to the heat source than does the trailing end, the heat source providing a localized zone within which a region of the fibres is sufficiently heat-softened to allow plastic flow stretching of the fibres to occur within this zone, said direction relative to the heat source being periodically reversed in order to carry out the progressive stretching operations of the process.

## 4,591,373
## METHOD FOR MOLDING HIGH-PRECISION GLASS PRODUCTS

Bunryo Sato, Hachioji, Japan, assignor to Kabushiki Kaisha Ohara Kogaku Garasu Seizosho, Sagamihara, Japan

Filed Dec. 14, 1984, Ser. No. 681,910
Claims priority, application Japan, Dec. 29, 1983, 58-249247
Int. Cl.[4] C03B *23/00*
U.S. Cl. 65—29 2 Claims

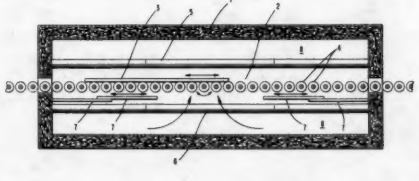



1. A method for molding high-precision glass products by heating and softening a piece of glass at least in the surface portion thereof and molding the glass piece by pressing the same between molding surfaces of a pair of molds comprising the step of causing relative movement of the molds toward each other during the pressing to follow change in dimension of an interval control member heated according to a temperature control independent of temperature control for heating said molds provided between said pair of molds, said interval control member having a coefficient of thermal expansion which is substantially equal to or larger than that of the glass piece and therefore being capable of thermal contraction in the pressing direction by an amount which is substantially equivalent to or larger than that of the glass piece in the pressing direction due to cooling of the glass piece, and said change in dimension of said interval control member being caused by thermal contraction due to cooling thereof.

## 4,591,374
## APPARATUS FOR EQUALIZING THE TEMPERATURE OF CONVEYOR ROLLS IN A GLASS-TEMPERING FURNACE

Jorma J. Klemola, Nattari, Finland, assignor to O/Y Kyro A/B Tamglass, Finland

Filed May 20, 1985, Ser. No. 735,764
Claims priority, application Finland, May 24, 1984, 842072
Int. Cl.[4] C03B *23/02*
U.S. Cl. 65—350 6 Claims




1. An apparatus for equalizing the temperature of conveyor rolls in a glass-tempering furnace, said furnace comprising a thermally insulated housing (1) confining a heating chamber (8), conveyor rolls (4), extending horizontally between the side walls of said chamber (8) and lying successively in the lengthwise direction of the chamber, heating resistors (5 and 6) in the chamber above and below the array of conveyor rolls, as well as means for driving the conveyor rolls unidirectionally during a first cycle and in reciprocating fashion during a second cycle, characterized in that between the heating resistors (6) below the array of conveyor rolls and the actual rolls (4) are mounted screen plates (7) at the end sections of the furnace.

## 4,591,375
## UREA-ACETALDEHYDE AND UREA-ACETALDEHYDE-PROPIONALDEHYDE SOLUTIONS

Paul Sartoretto, North Brunswick, N.J., assignor to W. A. Cleary Chemical Corporation, Somerset, N.J.

Continuation-in-part of Ser. No. 551,315, Nov. 13, 1983, abandoned. This application Sep. 30, 1985, Ser. No. 782,029
Int. Cl.[4] C05C *9/00*
U.S. Cl. 71—28 14 Claims

1. A process for preparing a clear aqueous fertilizer solution of the reaction products of urea and acetaldehyde which comprises:

(a) reacting urea with acetaldehyde in an aqueous medium at a pH from about 3.1 to 4.5 at temperatures from about 30° C. to 75° C. to form a clear solution wherein the mole ratio of urea to acetaldehyde is from about 1.3 to 2.5:1, the total nitrogen concentration is from about 10% to 22% based on the weight of nitrogen in the urea; and

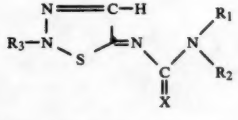
(b) neutralizing said solution to a pH of from about 6.5 to 8.0.

## 4,591,376
## 1,2,3-THIADIAZOL-3-IN-5-YLIDENE-UREA DERIVATIVES, METHODS FOR THE PRODUCTION OF THESE COMPOUNDS AS WELL AS COMPOSITIONS CONTAINING THE SAME AND HAVING GROWTH-REGULATORY AND DEFOLIATING ACTIVITY

Hansjörg Krähmer; Reinhart Rusch; Hans-Rudolf Krüger, and Volkert Sjut, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin, Fed. Rep. of Germany

Filed May 21, 1984, Ser. No. 612,444
Claims priority, application Fed. Rep. of Germany, May 20, 1983, 3319008
Int. Cl.[4] C07D *285/06;* A01N *47/36*
U.S. Cl. 71—90 16 Claims

1. 1,2,3-thiadiazol-3-in-5-yliden-urea derivative of the general formula




in which

$R_1$ is hydrogen, methyl, ethyl, propyl, isopropyl or butyl;

$R_2$ is methyl, ethyl, propyl, cyclopentyl, cyclohexyl, methylcyclohexyl, phenyl, halophenyl, nitrophenyl, trifluoromethylphenyl, methoxyphenyl or pyridyl;

$R_3$ is methyl, ethyl, proply, isopropyl, n-butyl, isobutyl, sec-butyl, tert-butyl, pentyl, hexyl, heptyl, octyl, nonyl, decyl, 3,3-dimethylpropyl, chloromethyl, fluoromethyl, 2-chloroethyl, 2-hydroxyethyl, 2-methylsulfonyloxyethyl, 2-acetoxyethyl, methoxymethyl, 2-methoxyethyl, 2-ethoxyethyl, 2-phenoxyethyl, 2-(2,4-dichlorophenoxy)-ethyl, 2-(4-chlorophenoxy)-ethyl, 2-dimethylamino-ethyl, 3-chloropropyl, 3-methoxypropyl, (2-methyl-1,3-dioxolan-2-yl)-methyl, 3-dimethylamino propyl, 3-phenoxypropyl, 2,2-dichlorocyclopropylmethyl, ethenyl, 2-propenyl, 3-methyl-2-buten-1-yl, 2-methyl-1-propen-3-yl, hexenyl, heptenyl, octenyl, 2-propinyl, butinyl, pentinyl, hexinyl, benzyl, 2-fluorobenzyl, 4-fluorobenxyl, 2-chlorobenzyl, 2-bromobenzyl, 3-bromobenzyl, 4-bromobenzyl, 2,4-dichlorobenzyl, 3-methylbenzyl, 4-methylbenzyl, 2-nitrobenzyl, 3-nitrobenzyl, 4-nitrobenzyl, 2-trifluoromethylbenzyl, 3-trifluoromethylbenzyl, 4-trifluoromethylbenzyl, 2-methoxybenzyl, 3-methoxybenzyl, 4-methoxybenzyl, 2-ethoxybenzyl, 3-ethoxybenzyl, 4-ethoxybenzyl, 2-propoxybenxyl, 3-propoxybenzyl, 4-propoxybenzyl, 2-butoxybenzyl, 3-butoxybenzyl, 4-butoxybenzyl, 2-methyl-

thiobenzyl, 3-methylthiobenzyl, 4-methylthiobenzyl, 2-ethylthiobenzyl, 3-ethylthiobenzyl, 4-ethylthiobenzyl, 2-butylthiobenzyl, 3-butylthiobenzyl or 4-butylthiobenzyl; and

X is an oxygen or a sulfur atom;

as well as its acid addition salts with an inorganic or an organic acid.

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**4,591,377**

## HERBICIDAL ESTERS OF 2-BROMO-4-METHYLIMIDAZOLE-5-CARBOXYLIC ACID

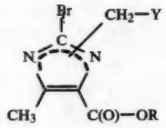
**Andrea Leone-Bay, Ridgefield, Conn., and Peter E. Timony, Valley Cottage, N.Y., assignors to Stauffer Chemical Company, Westport, Conn.**

**Filed Sep. 10, 1985, Ser. No. 774,279**

**Int. Cl.**[4] **A01N** *43/52, 43/50;* **C07D** *403/06, 401/06*

**U.S. Cl. 71—92** **12 Claims**

7. The method of controlling undesirable broadleaf vegetation comprising applying to the area where control is desired an herbicidally effective amount of a compound having the structural formula



wherein R is $C_1$–$C_{10}$ alkyl; $C_3$–$C_8$ cycloalkyl, $C_3$–$C_8$ cycloalkylalkyl wherein the alkyl has 1 to 6 carbon atoms, $C_3$–$C_{10}$ alkenyl, $C_5$–$C_8$ cycloalkenyl; benzyl or mono- or di-substituted benzyl wherein the substituents are $C_1$–$C_4$ alkyl, halogen, nitro or $C_1$–$C_4$ haloalkyl and Y is substituted or unsubstituted 2-, 3- or 4-pyridyl or 2-benzimidazoyl wherein the substituent is halogen, $C_1$–$C_4$ alkyl or —C(O)OR$^2$ wherein R$^2$ is $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy or CN.

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**4,591,378**

## AGRICULTURAL SULFONAMIDES

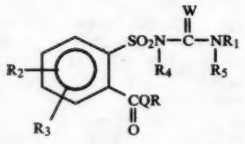
**George Levitt, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 382,369, May 26, 1982, abandoned, which is a division of Ser. No. 98,781, Nov. 30, 1979, Pat. No. 4,394,506, which is a continuation-in-part of Ser. No. 29,281, Apr. 13, 1979, abandoned, which is a continuation-in-part of Ser. No. 15,341, Mar. 1, 1979, abandoned, which is a continuation-in-part of Ser. No. 965,070, Nov. 30, 1978, abandoned, which is a continuation-in-part of Ser. No. 910,965, May 30, 1978, abandoned. This application Feb. 21, 1984, Ser. No. 581,602**

**Int. Cl.**[4] **C07D** *251/46, 251/52, 251/18;* **A01N** *43/70*

**U.S. Cl. 71—93** **33 Claims**

1. A compound selected from



wherein

Q is O or S,

R is $C_1$–$C_{12}$ alkyl; $C_3$–$C_{10}$ alkenyl; $C_3$–$C_{10}$ alkynyl; $C_2$–$C_6$ alkyl substituted with 1–4 substituents selected from (a) 0–3 atoms of F, Cl or Br, (b) 0–2 $OCH_3$ groups or (c) 0–1 cyano groups;

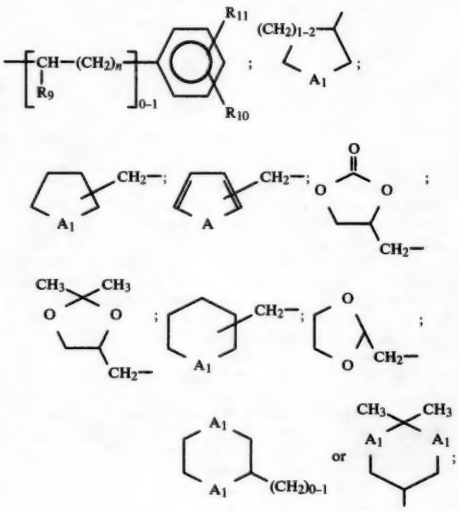
R is also $CH_2CH$; $CH(R_7')CO_2CH_3$; $CH(R_7')CO_2C_2H_5$; $C_3$–$C_6$ alkenyl substituted with 1–3 atoms of F, Cl or Br;

R is also $C_3$–$C_6$ alkynyl substituted with one of F, Cl or Br;

R is also $C_5$–$C_8$ cycloalkyl; $C_5$–$C_8$ cycloalkenyl; $C_5$–$C_6$ cycloalkyl substituted with (a) $OCH_3$, (b) $C_2$–$C_4$ alkyl, (c) F, Cl or Br or (d) 1–4 $CH_3$ groups;

R is also $C_4$–$C_{10}$ cycloalkylalkyl; $C_4$–$C_8$ cycloalkylalkyl substituted with 1–2 $CH_3$ groups;

R is also $C_7$–$C_{10}$ bicycloalkyl; $C_7$–$C_{10}$ bicycloalkenyl; $C_{10}$ tricycloalkyl; $C_{10}$ tricycloalkenyl;



$R_7'$ is H or $CH_3$;

$R_9$ is H or $C_1$–$C_3$ alkyl;

$R_{10}$ and $R_{11}$ are independently H, $C_1$–$C_3$ alkyl, Cl, Br, $OCH_3$ or $OC_2H_5$;

$R_{10}$ and $R_{11}$ may be taken together to form —$(CH_2)_3$— —$(CH_2)_4$—, —$OCH_2O$— or —$OCH_2CH_2O$—;

n is 0, 1, 2 or 3;

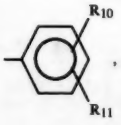
A is O or S;

$A_1$ is O, S or $SO_2$;

when Q is O, then additional values of R are H; M; $CH_2CH_2OR_7$; $CH_2CH_2CH_2OR_7$; $CH(CH_3)CH_2OR_7$; $CH_2OR_8'$; $(CH_2CH_2O)_{n'}R_8$; $(CH(CH_3)CH_2O)_{n'}R_8$; $CH_2CH_2S(O)_{0,2}R_{12}$; $CH_2CH_2CH_2S(O)_{0,2}R_{12}$;

$R_7$ is $CH_2CH_3$, $CH(CH_3)_2$, phenyl, $CH_2CH_2Cl$ or $CH_2CCl_3$;

$R_8'$ is $CH_3$, $CH_2CH_3$, $CH(CH_3)_2$, $CH_2CH_2Cl$, $CH_2CCl_3$, phenyl,



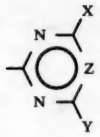
$CH_2CH_2OCH_3$ or $CH_2CH_2OCH_2CH_3$;

$R_8$ is $CH_3$, $CH_2CH_3$, $CH(CH_3)_2$, phenyl, $CH_2CH_2Cl$ or $CH_2CCl_3$;

n' is 2 or 3;

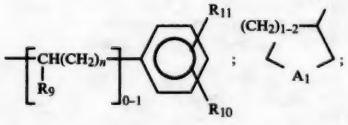
$R_{12}$ is $CH_3$, $CH_2CH_3$, $CH(CH_3)_2$ or phenyl;

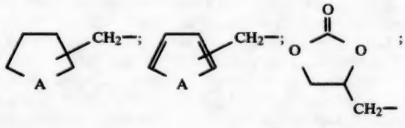
$R_1$ is

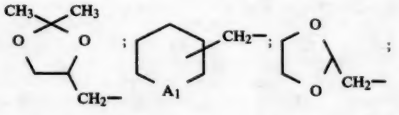


$R_2$ is H, Cl, Br, F, $C_1$–$C_3$ alkyl, $NO_2$, $SO_2CH_3$, $OCH_3$, $SCH_3$, $CF_3$, $N(CH_3)_2$, $NH_2$ or CN;
$R_3$ is H, Cl, Br, F or $CH_3$;
$R_4$ is H or $CH_3$;
$R_5$ is H, $CH_3$ or $OCH_3$;
M is an alkali metal;
W is O or S;
X is H, Cl, $CH_3$, $OCH_3$, $OCH_2CH_3$ or $OCH_2CH_2OCH_3$;
Y is H; F; Cl; Br; $C_1$–$C_4$ alkyl; C(O)L; $C_1$–$C_4$ alkyl substituted with (a) $OCH_3$, (b) $OC_2H_5$, (c) CN, (d) C(O)L or (e) 1–3 atoms of F, Cl or Br;
Y is also $C_3$–$C_4$ alkenyl; $CH_2C{\equiv}CR_{13}$; $A(CH_2)_{n'}$— $A_1$(-$C_1$–$C_3$ alkyl); $ACH_2C(O)L$; $ACH(CH_3)C(O)L$; $ACH_2CH_2C(O)L$; SCN; $N_3$; $NR_{16}R_{17}$; $OR_{14}$ or $SR_{15}$;
$R_{13}$ is H, $CH_3$ or $CH_2Cl$;
n', A and $A_1$ are as previously defined;
L is $NH_2$, OH, $N(OCH_3)CH_3$, $NH(C_1$–$C_4$ alkyl), $N(C_1$–$C_4$ alkyl)$_2$ or $C_1$–$C_6$ alkoxy;
$R_{16}$ is H or $CH_3$
$R_{17}$ is H, $OCH_3$, $C_1$–$C_6$ alkyl, $C_1$–$C_4$ alkyl substituted with (a) CN or (b) C(O)L;
$R_{17}$ is also $C_3$–$C_4$ alkenyl, $C_3$–$C_6$ cycloalkyl or $C_2$–$C_3$ alkyl substituted with (a) $OCH_3$ or (b) $OC_2H_5$;
$R_{16}$ and $R_{17}$ may be taken together to form $—CH_2CH_2CH_2CH_2—$ or $—CH_2CH_2OCH_2CH_2—$;
$R_{14}$ is $C_1$–$C_4$ alkyl; $C_2$–$C_4$ alkyl substituted with 1–3 atoms of F, Cl or Br; $C_1$–$C_4$ alkyl substituted with CN; $C_3$–$C_4$ alkenyl; $CH_2C{\equiv}CR_{13}$; or

$R_{15}$ is $C_1$–$C_4$ alkyl, allyl, propargyl or $C_1$–$C_2$ alkyl substituted with CN;
Z is N;
provided that
(a) when R is other than







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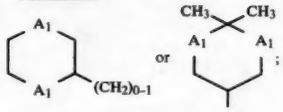
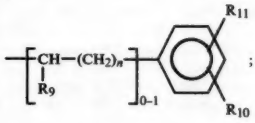


then Y is C(O)L; $C_1$–$C_4$ alkyl substituted with C(O)L; $ACH_2C(O)L$; $ACH(CH_3)C(O)L$; $ACH_2CH_2C(O)L$ or $NR_{16}R_{17}$ wherein A and L are as previously defined, $R_{16}$ is H or $CH_3$, $R_{17}$ is $C_1$–$C_4$ alkyl substituted with C(O)L; or $R_{16}$ and $R_{17}$ may be taken together to form $—CH_2CH_2CH_2CH_2—$ or $—CH_2CH_2OCH_2CH_2—$;
(b) when R is



then the total number of carbon atoms of R is less than or equal to 12;
(c) the total number of carbon atoms of R is less than or equal to 13;
(d) when Y is greater than or equal to 4 carbon atoms, then R is less than or equal to 4 carbon atoms; and
(e) when X is Cl, then Y is Cl and when X and Y are both H, then R is less than or equal to 4 carbon atoms.

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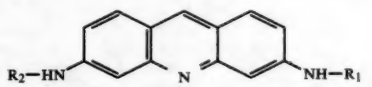
**4,591,379**

## PLANT GROWTH REGULATORS

**Antal Kovács; János Erdei; Károly Kováts; László Pólya; Károly Pásztor; János Nagy; Pál Pepó ; Péter Pepó , all of Debrecen; György Kiss, and István Kajati, both of Budapest, all of Hungary, assignors to Biogal Gyogyszergyar, Debrecen, Hungary**

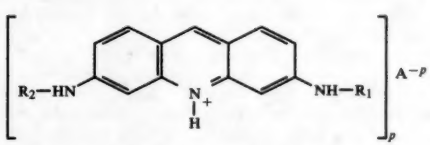
**Filed Mar. 23, 1984, Ser. No. 593,040**
**Claims priority, application Hungary, Mar. 23, 1983, 962/83**
**Int. Cl.[4] A01D** *43/42*
**U.S. Cl. 71—94** **4 Claims**

1. A method for regulating the growth of plants which comprises the step of treating the plant or a propagating part thereof with an effective amount of a 3,6-diaminoacridine N-glycoside of the formula (I)



(I)

or its agriculturally acceptable acid addition salt of the formula (II)



(II)

in which formulae
at least one of $R_1$ and $R_2$ stands for an α- and/or β- (D)- and/or α- and/or β-(L)-glucosyl, -galactosyl, -mannosyl, -xylosyl, -arabinosyl, -ribosyl, -6-desoxyglucosyl, -6-desoxygalactosyl, -ramnosyl, -maltosyl, -2-acetamido-2-

desoxyglucosyl, -lactosyl, -cellobiosyl, -genciobiosyl or -laminaribiosyl group and the other one represents either a hydrogen atom or one of the enumerated sugar groups;
A is a residue of an agriculturally acceptable acid;
p stands for 1, 2 and 3.

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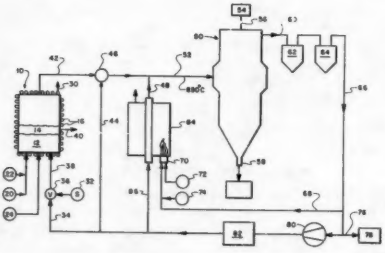
**4,591,380**

## METHOD OF GENERATING A REDUCING GAS

**Frank V. Summers; David C. Meissner, and Ronald Brown, all of Charlotte, N.C., assignors to Midrex International B.V. Rotterdam, Zurich Branch, Zurich, Switzerland**

**Continuation-in-part of Ser. No. 556,502, Dec. 1, 1983, abandoned, which is a continuation-in-part of Ser. No. 360,713, Mar. 22, 1982, abandoned. This application Sep. 4, 1985, Ser. No. 772,281**
**Int. Cl.[4] C21B *13/06***
**U.S. Cl. 75—35** **10 Claims**



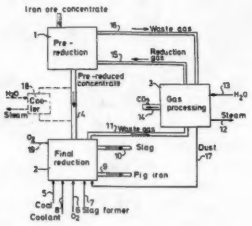
1. In a method for generating a reducing gas wherein sulfur-containing fuel, oxygen and a flux are injected into a molten metal bath within a pressure-tight vessel beneath the surface of the bath to produce a partially-desulfurized partial-oxidation gas having a hydrogen and carbon monoxide content of at least 80%, the molten metal bath consisting essentially of from 1.5 to 4.5 percent carbon, the balance substantially iron, the molten metal bath having a slag layer thereon, the improvement comprising:
(a) injecting a coolant into the molten metal bath beneath the surface of the bath, said coolant being a fuel-rich gas selected from the group consisting of hydrogen, carbon monoxide, carbon dioxide lean spent top gas from a direct reduction furnace, methane, and any mixture thereof;
(b) maintaining the temperature of the molten metal bath between 1350° C. and 1600° C. by monitoring the molten metal bath temperature and increasing or decreasing the coolant flow rate to lower or raise the bath temperature respectively as required;
(c) quenching the partial-oxidation gas with carbon dioxide lean gas to produce a tempered reducing gas at a temperature between about 800° and 900° C.;
(d) introducing said tempered gas into a direct reduction furnace having an iron oxide burden therein to reduce the iron oxide to metallized iron product and form a top gas;
(e) removing the top gas from the furnace and removing a substantial portion of the carbon dioxide therefrom to form a $CO_2$-lean gas; and
(f) introducing said $CO_2$-lean gas to the bottom of the molten metal bath as a coolant to cool the metal bath.

**4,591,381**

## PROCESS OF PRODUCING PIG IRON FROM IRON ORE CONCENTRATE

**Carl-Lennart Axelsson, Enskede, and Krister Torssell, Söderbärke, both of Sweden, assignors to IPS Interproject Service AB, Bettna, Sweden**

**PCT No. PCT/SE84/00067, § 371 Date Oct. 24, 1984, § 102(e) Date Oct. 24, 1984, PCT Pub. No. WO84/03521, PCT Pub. Date Sep. 13, 1984**
**PCT Filed Feb. 24, 1984, Ser. No. 676,198**
**Claims priority, application Sweden, Mar. 2, 1983, 8301159**
**Int. Cl.[4] C21B *13/14***
**U.S. Cl. 75—40** **7 Claims**




1. In a process for producing pig iron by reducing iron ore concentrate in which solid pre-reduced iron ore, coal, oxygen gas, and slag formers are injected beneath the surface of a molten iron bath contained in a reactor vessel, and react to produce said pig iron, slag, and exhaust gases including $CO_2$, CO, $H_2$ and $H_2O$, the improvement comprising:
A. adjusting the ratio $CO_2/CO$ in the exhaust gases from said vessel to a value greater than the ratio corresponding to equilibrium condition between the carbon in the bath and the $CO_2CO$ gases at the surface of the bath under atmospheric pressure, and maintaining the value of said ratio at at least 0.055 but not greater than 3 in order to increase the heat generated by the bath while minimizing the amount of coal injected for final reduction of the iron ore injected therein; and
B. reacting CO and $H_2$ in said exhaust gases with iron ore for pre-reduction thereof prior to injection of the ore into said bath, wherein the amount of coal injected into said vessel is sufficient to generate a quantity of CO sufficient, together with said $H_2$, for said pre-reduction, based on the quantity of iron ore being pre-reduced, and the $CO_2/CO$ ratio.

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**4,591,382**

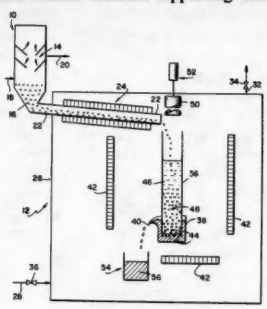
## PROCESS AND APPARATUS FOR RECOVERING AND PURIFYING URANIUM SCRAP

**Guy R. B. Elliott, 133 La Senda Rd., Los Alamos, N. Mex. 87544**

**Filed Mar. 22, 1980, Ser. No. 133,021**
**Int. Cl.[4] C22B *60/02***
**U.S. Cl. 75—84.1 R** **6 Claims**

1. A process for producing metallic uranium from scrap containing metallic uranium, which comprises:
(a) forming in a contact zone under an inert atmosphere a bath supported on molten uranium, said bath containing, in molten form, at least one member selected from the group consisting of $CaF_2$, $BaF_2$, $MgF_2$, LiF, $YF_3$, trifluorides of lanthanides, and mixtures thereof, said bath being at a temperature above the melting point of uranium and said contact zone including contact means within said bath for intimately contacting said bath and said scrap containing metallic uranium;
(b) introducing under an inert atmosphere said scrap containing metallic uranium into said bath under conditions to form molten uranium; and

(c) recovering metallic uranium from said molten uranium from said molten uranium supporting bath wherein said



bath includes solid titanium oxide to remove carbon, nitrogen, and silicon.

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**4,591,383**

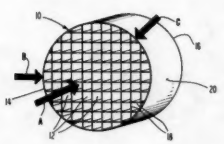
## APPARATUS AND METHOD OF FILTERING MOLTEN METAL USING HONEYCOMB STRUCTURE OF SINTERED ALUMINA AS FILTER ELEMENT

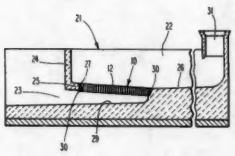
**Charles N. McGarry, Clarksville, and Thomas M. Wehrenberg, Jeffersonville, both of Ind., assignors to Corning Glass Works, Corning, N.Y.**

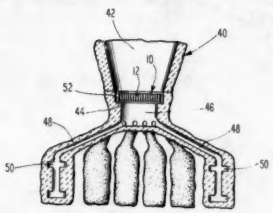
**Continuation of Ser. No. 429,654, Sep. 30, 1982, abandoned. This application Oct. 19, 1984, Ser. No. 663,022**

**Int. Cl.⁴ B01D** *39/20*

**U.S. Cl. 75—93 R** **14 Claims**







**1.** An apparatus comprising:

a molten metal filter of honeycomb structure with a multiplicity of thin walls defining a multiplicity of open ended, substantially uniform, hollow cells extending between a pair of honeycombed outer surfaces of the filter, said thin walls being formed by a sintered aggregation of alumina grains, essentially all of said grains having a crystalline form with sharp crystalline corners and wide boundaries between the grains characteristic of alumina having undergone exaggerated grain growth, the aggregation further being at least 98% or more by weight $Al_2O_3$ and free of alumina grain growth inhibitors in amounts effective to having inhibited alumina grain growth;

means for conveying molten metal to be filtered to one of said honeycombed surfaces of the filter; and

means for conveying the molten metal from the remaining honeycombed surface of the filter after passage through said cells.

**7.** A method of filtering molten metal comprising the steps of:

providing a molten metal filter of honeycomb structure formed by a multiplicity of thin walls defining a multiplicity of open ended, substantially uniform, hollow cells extending between a pair of honeycombed outer surfaces of the filter, said thin walls being formed by a sintered aggregation of alumina grains, essentially all of said grains having a crystalline form with sharp crystalline corners and wide boundaries between the grains characteristic of alumina having undergone exaggerated grain growth, the aggregation further being at least 98% or more by weight $Al_2O_3$ and free of grain growth inhibitors in amounts effective to have inhibited alumina grain growth;

conveying molten metal to be filtered to one of said honeycombed surfaces of the filter;

passing the molten metal through said one honeycombed surface, the hollow cells of the structure and said remaining honeycombed surface; and

conveying the filtered molten metal away from said remaining honeycombed surface of the filter.

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**4,591,384**

## DENTAL CEMENT COMPOSITIONS

**Shoji Akahane, Higashikurume; Kazuo Hirota, Tokyo, and Kentaro Tomioka, Chofu, all of Japan, assignors to G-C Dental Industrial Corp., Tokyo, Japan**

**Filed Jul. 19, 1984, Ser. No. 632,462**

**Claims priority, application Japan, Aug. 5, 1983, 58-142515**

**Int. Cl.⁴ A61K** *5/01*

**U.S. Cl. 106—35** **9 Claims**

**1.** In a dental cement composition comprising:

(a) a first ingredient containing as the main component a metal oxide and

(b) a second ingredient capable of reacting with the first ingredient to form a set mass, the improvement comprising, as said second ingredient, a mixture of;

(I) a tannic acid derivtive that is sparingly soluble in water selected from the group consisting of a tannic acid/protein complex, a tannic acid/formaldehyde reaction product, acetyl tannate, a metal tannate or a mixture thereof, and

(II) a water-soluble reducing agent selected from the group consisting of a stannous tin salt, formic acid, oxalic acid and a salt of phosphorous or hypophosphorous acids.

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**4,591,385**

## DIE MATERIAL AND METHOD OF USING SAME

**Jeannine A. Pearsall, Spring Valley, N.Y., assignor to Aremco Products, Inc., Ossining, N.Y.**

**Filed Jun. 4, 1984, Ser. No. 617,116**

**Int. Cl.⁴ B28B** *7/28*

**U.S. Cl. 106—38.3** **4 Claims**

**1.** A ceramic die for casting a dental prosthesis, produced by providing a composition comprising:

one portion by weight of a liquid binder, comprising colloidal silica sol of about 40% solids content, and from one to five portions by weight of a dry blend, said blend consist-

ing essentially of 50–80 parts by weight of magnesium oxide, 10–40 parts by weight of alumina not coarser than 100 mesh, 2 to 6 parts by weight of monohydrated ammonium phosphate, and 1 to 4 parts by weight of dihydrated ammonium phosphate forming the composition into the desired shape of the die and allowing same to set.

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**4,591,386**

## CONTINUOUS APPARATUS FOR CHEMICAL CONVERSION OF MATERIALS

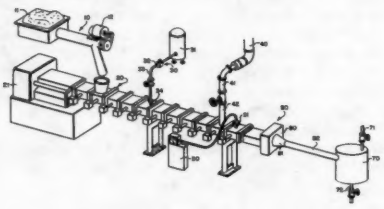
**Barry Rugg, New York, and Robert Stanton, New Hyde Park, both of N.Y., assignors to New York University, New York, N.Y.**

**Division of Ser. No. 255,189, Apr. 17, 1981, Pat. No. 4,390,375, which is a continuation-in-part of Ser. No. 131,339, Mar. 18, 1980, Pat. No. 4,316,748. This application Mar. 25, 1983, Ser. No. 479,055**

**The portion of the term of this patent subsequent to Feb. 23, 1999, has been disclaimed.**

**Int. Cl.[4] B01J *3/04***

**U.S. Cl. 127—1** **11 Claims**



1. In an apparatus for the acid hydrolysis of waste cellulose to glucose of the type having extruding means comprising a housing having means defining a cellulose inlet port receptive of waste cellulose, means defining a steam inlet port and means associated therewith for introducing steam into the cellulose, means defining an outlet port, and a reaction zone between the cellulose inlet port and the outlet port, and twin screws for continuously conveying the waste cellulose through the reaction zone towards the outlet port, means for continuously feeding the waste cellulose to the cellulose inlet port and means for maintaining an elevated temperature and pressure within the reaction zone during discharge, the improvement wherein the maintaining means maintains an elevated pressure of 135 psi to 1000 psi and solely comprises means forming a dynamic seal in the twin screws at the upstream end of the reaction zone and a continuously open discharge orifice pipe downstream of the outlet port configured to permit a predetermined volume of flow necessary to maintain the elevated pressure.

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**4,591,387**

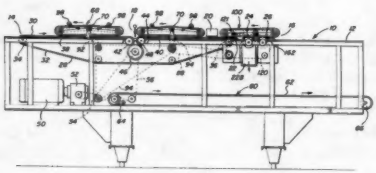
## ALOE VERA LEAF PROCESSOR

**William G. De Gray, P.O. Box 36, Port Isabel, Tex. 78578**

**Filed Feb. 7, 1984, Ser. No. 577,961**

**Int. Cl.[4] C13C *1/00***

**U.S. Cl. 127—24** **12 Claims**



1. An aloe vera leaf processor for processing elongated aloe vera leaves including marginally joined top and bottom rind panels each including an adjacent thin aloin layer and a gel layer disposed between the aloin layers of said panels, said processor including an elongated conveyor assembly for lengthwise receiving an elongaged leaf thereon at one end and including means for supporting and lengthwise advancing said leaf along said conveyor assembly toward the other end thereof, said conveyor assembly including first, second, third and fourth locations thereon spaced along the conveyor assembly from said one end toward said other end, said first location including first cutting means operative to transversely cut the leading and trailing ends of said leaf therefrom as said leaf is conveyed through said first location, second cutting means disposed at said second location operative to contour cut the opposite side marginal edges of said leaf from the remainder thereof, third cutting means disposed at said third location operative to cut one of the top and bottom rind panels as well as the attendant aloin layer from said leaf and gel removal means disposed at said fourth location operative to remove to gel layer, exposed by the removal of said one rind panel, from the other rind panel attendant aloin layer of said leaf.

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**4,591,388**

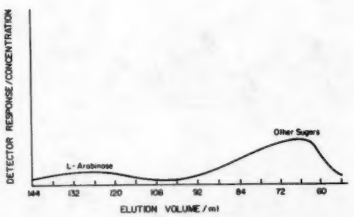
## SEPARATION OF ARABINOSE BY SELECTIVE ADSORPTION ON ZEOLITIC MOLECULAR SIEVES

**Chien C. Chao, Millwood, and John D. Sherman, Chappagua, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.**

**Division of Ser. No. 454,655, Dec. 30, 1982, Pat. No. 4,516,566. This application May 6, 1985, Ser. No. 731,001**

**Int. Cl.[4] C13K *13/00***

**U.S. Cl. 127—46.3** **10 Claims**




1. A selective adsorption process for the separation of L-arabinose from a liquid mixture containing L-arabinose and at least one other aldose which process comprises: (a) contacting said liquid mixture, at a pressure sufficient to maintain liquid phase for the liquid mixture, with an adsorbent composition comprising a BaX crystalline aluminosilicate zeolite, whereby L-arabinose is selectively adsorbed thereon; (b) removing the non-adsorbed portion of said liquid mixture from contact with the adsorbent composition; and (c) desorbing L-arabinose from said adsorbent composition by contacting said adsorbent composition with a desorbing agent and recovering desorbed L-arabinose.

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**4,591,389**

## FLUE CLEANING APPARATUS

**Gary Everitt, Box 56 R.D. #3, Washington, N.J. 07882**

**Filed Nov. 23, 1983, Ser. No. 554,622**

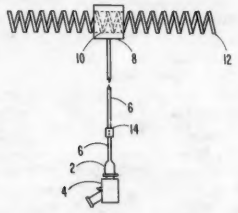
**Int. Cl.[4] F23J *3/02***

**U.S. Cl. 134—8** **7 Claims**

1. Apparatus for cleaning chimney flues, comprising

a flexible shaft,

means defining a plurality of coiled compression springs, and




means for respectively attaching said springs to said shaft such that the springs are transverse thereto and have free ends.

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4,591,390

## CABLE CLEANING SYSTEM

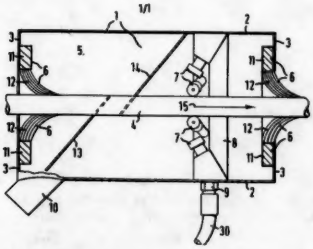
John E. Scott, London, and Harold Griffiths, Hereford, both of England, assignors to Shell Internationale Research Maatschappij B. V., Netherlands

Filed Jan. 4, 1982, Ser. No. 336,925

Claims priority, application United Kingdom, Mar. 25, 1981, 8109409

Int. Cl.[4] B08B 1/02

U.S. Cl. 134—15 2 Claims




1. A method of cleaning and lubricating a cable by means of a cable cleaning and lubricating system of the type which includes a chamber adapted to surround a section of a cable to be cleaned and lubricated and to be displaced relative to the cable, nozzles within the chamber for directing jets of relatively high pressure cleaning and lubricating liquid onto the surface of the cable, sealing means at both ends of the chamber and adapted to contact the cable, and the chamber being provided with an outlet, which method comprises: displacing the chamber relative to the cable, passing the cleaning and lubricating liquid at a relatively high pressure to the nozzles in order to direct jets of relatively high pressure liquid onto the surface of the cable, operating a vacuum pump in communication with a vapor space of a tank for collecting used cleaning liquid and with the outlet of the chamber so as to cause a reduction of pressure in the vapor space and in the chamber to a value which is so much below atmospheric pressure that a flow of air from the surroundings along the sealing means and into the chamber is maintained, whereby any leakage of fluid from the chamber is prevented.

4,591,391

## METHOD FOR REMOVING POLYMER SCALE DEPOSITED ON REACTOR WALLS AND A POLYMER SCALE REMOVER AGENT THEREFOR

Toshihide Shimizu, Chiba; Ichiro Kaneko, and Yoshiteru Shimakura, both of Ibaraki, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 596,267, Apr. 3, 1984, abandoned. This application Mar. 12, 1985, Ser. No. 711,036

Claims priority, application Japan, Apr. 4, 1983, 58-59032; Jun. 20, 1983, 58-110606

Int. Cl.[4] B08B 9/00

U.S. Cl. 134—22.17 11 Claims

1. A method for removing polymer scale from the reactor walls after completion of a run of polymerization of an ethylenically unsaturated polymerizable monomer or a monomer mixture in an aqueous medium which comprises applying a scale removed solution containing a soluble cellulose derivative selected from the group consisting of methyl celluloe, ethyl cellulose, hydroxypropyl methyl cellulose, carboxymethyl cellulose, carboxyethyl cellulose, nitrocellulose and cellulose acetate, dissolved therein to the polymer scale deposited on the reactor walls and washing down the polymer scale with a washing liquid.

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4,591,392

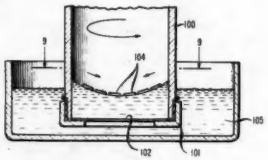
## FORMING AN ORDERED ARRAY FOR VISUAL INSPECTION

Patricia A. Beck, Atlantic City, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 13, 1984, Ser. No. 680,801

Int. Cl.[4] B08B 1/00

U.S. Cl. 134—25.4 9 Claims




1. A method of producing a nonoverlapping ordered array of objects comprising the following steps:

placing the objects onto a mesh screen within a container;

partially submerging the container in a bath of suitable fluid to cause the objects in the container to float on the fluid surface;

swirling the fluid around for a suitable period of time to cause the objects to order themselves in a nonoverlapping array in the center of the container; and

removing the container from the bath without disturbing the nonoverlapping nature of the array.

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4,591,393

## ALLOYS HAVING IMPROVED RESISTANCE TO HYDROGEN EMBRITTLEMENT

Russell D. Kane; James B. Greer; Dawn F. Jacobs, all of Houston, Tex., and Barry J. Berkowitz, Scotch Plains, N.J., assignors to Exxon Production Research Co. and Exxon Research & Engineering Co., both of Houston, Tex.

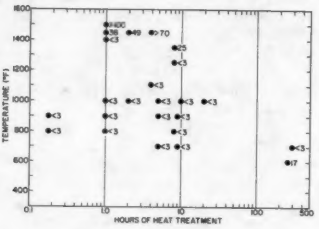
Continuation-in-part of Ser. No. 767,609, Feb. 10, 1977, abandoned. This application Mar. 1, 1978, Ser. No. 882,473

Int. Cl.[4] C21D 9/14

U.S. Cl. 148—11.5 N 6 Claims

1. A tubular metal product for use in sour gas wells characterized by resistance to hydrogen sulfide embrittlement at temperatures up to about 500° F. consisting essentially of an alloy having the composition 0.015% carbon, 19.9% to 20.0%

chromium, 34.47% to 35.03% nickel, 9.5% to 10.0% molybdenum, 0.5% to 0.82% titanium, 0.015% boron, 0% to 0.34% iron, and the balance cobalt, except for impurities, said tubular




product having been cold worked at least sufficiently to impart increased strength and from 50% to 63% and thereafter heat treated in the range 1350° F. to 1500° F.

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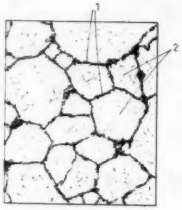
**4,591,394**

## METHOD FOR TREATING COPPER AND FOR USING THE THUS-TREATED COPPER

**Pieter-Paul Van Achter, Fazantendreef 14, 2850 Keerbergen, Belgium**

**Filed Mar. 26, 1985, Ser. No. 716,344**
**Claims priority, application Belgium, Apr. 17, 1984, 212782**
**Int. Cl.[4] B23P** *3/20*
**U.S. Cl. 148—11.5 Q** **15 Claims**




1. A method of manufacturing a hollow object made of a bimetal plate comprising a copper layer and a chromium-nickel steel layer, wherein:

the copper layer contains at least one grain growth-inhibiting component which is stable at 1000° C., together with aluminum;

cold pressing together the copper and chromium-nickel steel layers without any intermediate layer therebetween until a strong binding is formed;

annealing the resulting bimetal plate at a temperature between 800° C. and 1000° C.; and

subjecting the resulting annealed bimetal plate to a forming operation.

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**4,591,395**

## METHOD OF HEAT TREATING LOW CARBON STEEL STRIP

**James H. Steele, Jr., Carlisle; Alan J. Heckler; James W. Flowers, Jr., both of Middletown, and George S. Powley, Carlisle, all of Ohio, assignors to Armco Inc., Middletown, Ohio**

**Division of Ser. No. 491,867, May 5, 1983, abandoned. This application Dec. 20, 1984, Ser. No. 684,968**
**Int. Cl.[4] C21D** *9/46*
**U.S. Cl. 148—12 D** **11 Claims**

1. A method of producing hot-dip aluminum or aluminum alloy coated cold reduced, aluminum killed low carbon steel strip having high yield strength, which comprises providing a steel consisting essentially of up to about 0.1% carbon, at least about 0.015% acid soluble aluminum, manganese at least 10 times the sulfur content, up to about 1.2% copper, and balance essentially iron, hot rolling said steel, coiling the hot rolled steel at a temperature less than 1200° F. (649° C.), cold rolling to strip thickness, pretreating by heating said cold rolled strip within the range of about 700° to about 950° F. (about 370° to about 510° C.) for a time sufficient to precipitate aluminum nitride in an amount sufficient to elevate the recrystallization temperature, continuously annealing the pretreated strip at a temperature of about 1225° to about 1350° F. (about 665° to about 735° C.) in a hydrogen-containing atmosphere effective in reducing residual oxide, bringing the strip approximately to the temperature of a bath of molten aluminum or aluminum alloy, passing said strip through said bath, removing excess molten aluminum or aluminum alloy from said strip, and solidifying the aluminum or aluminum alloy remaining thereon.

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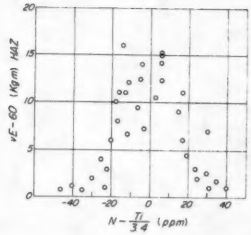
**4,591,396**

## METHOD OF PRODUCING STEEL HAVING HIGH STRENGTH AND TOUGHNESS

**Hiroo Mazuda; Hiroshi Tamehiro; Mamoru Ohashi, all of Kimizu; Yasumitsu Onoe, Kitakyushu, and Shinogu Tamukai, Nakama, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Continuation of Ser. No. 519,897, Aug. 4, 1983, abandoned, which is a continuation of Ser. No. 313,707, Oct. 21, 1981, abandoned. This application Sep. 4, 1984, Ser. No. 646,490**
**Claims priority, application Japan, Oct. 30, 1980, 55/151417**
**Int. Cl.[4] C21D** *7/14*
**U.S. Cl. 148—12 F** **16 Vol**




1. A method of producing a steel having high strength and toughness, as well as superior characteristics in a weld zone, comprising the steps of: preparing a steel material having a composition consisting of by weight 0.03 to 0.08% of C, not more than 0.6% of Si, 1.4 to 2.4% of Mn, 0.01 to 0.03% of Nb, 0.005 to 0.025% of Ti, 0.005 to 0.08% of Al, not more than 0.003% of S, 0.0005 to 0.005% of Ca, not more than 0.005% of O, not more than 0.005% of N, and the balance Fe and incidental impurities, said steel material further satisfying the conditions represented by formulas $-0.002\% \leqq N-(Ti/3.4) \leqq 0.002\%$ and the amount of each of Ca, O, and S being such as to satisfy the conditions of

$$1.5 \geqq \frac{[Ca]\{1 - 124[O]\}}{1.25[S]} \geqq 0.4$$

to control the morphology of MnS and to minimize the formation of inclusions; heating said steel material to a temperature between 900° C. and 1000° C.: effecting a rolling on said steel material such that the rolling reduction at temperature below 900° C. is 60% or higher and that the rolling is finished at a temperature between a temperature 20° C. above the $Ar_3$ transformation temperature and a temperature 10° C. below the $Ar_3$ transformation temperature; and immediately after the completion of said rolling, cooling the rolled steel material down to a temperature below 300° C. at a cooling rate ranging

between 15° C./sec. and 60° C./sec. to obtain fine upper bainite structure or a duplex structure of fine bainite and fine ferrite, whereby said steel has a toughness value of at least 10.5 kg.m in VE-60° C. with respect to the property of the welded zone.

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**4,591,397**

## NON-CYANIDE SALT BATH AND PROCESS FOR CARBURIZATION OF FERROUS METALS AND ALLOYS

**William C. Jones, Enfield, Conn.; Kenneth R. Britt, Easthampton, Mass., and Isaac L. Newell, Manchester, Conn., assignors to Heatbath Corporation, Springfield, Mass.**

**Division of Ser. No. 566,288, Dec. 28, 1983, abandoned. This application Feb. 26, 1985, Ser. No. 705,852**

**Int. Cl.[4] C23C *9/10*; C21D *1/48***

**U.S. Cl. 148—15.5** **6 Claims**

1. A process for carburizing ferrous metal objects consisting essentially of the following process steps:

(a) mixing a composition comprising about 85-99% alkali metal chloride or a mixture of alkali metal chlorides; 0.25-8% of an activator, an oxygen containing compound selected from the group consisting of barium and strontium; and sufficient amount of, finely divided graphite to provide a continuous cover over the molten salt mixture;

(b) melting and heating the mixture to a temperature in the range of about 900° C.-1050° C.;

(c) maintaining the temperature for about 1 hour;

(d) immersing said ferrous metal objects in the bath for a period of time to achieve the desired degree of carburization.

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**4,591,398**

## METHOD FOR MANUFACTURING A SEMICONDUCTOR DEVICE UTILIZING SELF-ALIGNED OXIDE-NITRIDE MASKING

**Norikazu Ouchi; Akio Kayanuma, and Katsuaki Asano, all of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan**

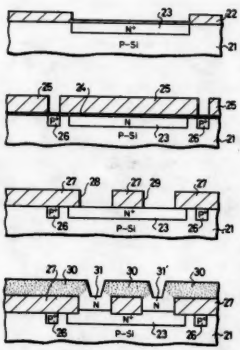
**PCT No. PCT/JP84/00271, § 371 Date Jan. 25, 1985, § 102(e) Date Jan. 25, 1985, PCT Pub. No. WO84/04853, PCT Pub. Date Dec. 6, 1984**

**PCT Filed May 25, 1984, Ser. No. 700,707**

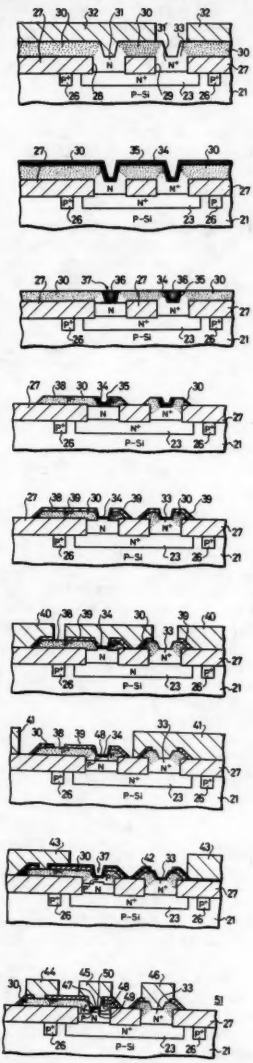
**Claims priority, application Japan, May 26, 1983, 58-92697**

**Int. Cl.[4] H01L *21/20, 21/302***

**U.S. Cl. 148—187** **7 Claims**



1. A method for manufacturing a semiconductor device comprising the steps of forming a semiconductive layer having formed on its surface a concave portion, forming a nitride layer within said concave portion, forming an oxide layer on a surface of said semiconductive layer with said nitride layer as a



mask, removing said nitride layer, and introducing an impurity into said semiconductive layer with said oxide layer as a mask.

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**4,591,399**

## IGNITING MIXTURE FOR CHEMICAL OXYGEN GENERATORS

**Carl E. van der Smissen, Lubeck, and Rainer Ernst, Curau, both of Fed. Rep. of Germany, assignors to Drägerwerk AG, Fed. Rep. of Germany**

**Filed Jul. 2, 1985, Ser. No. 752,234**

**Claims priority, application Fed. Rep. of Germany, Jul. 4, 1984, 3424502**

**Int. Cl.[4] C06B *45/00***

**U.S. Cl. 149—2** **10 Claims**

1. An igniting mixture for chemical oxygen generators com-

prising an alkali metal oxygen compound with an activator containing one of active oxygen and silicon which are both ground and mixed together and pressed under moderate pressure into a cone, the alkali metal oxygen compound being selected from the group consisting of alkali metal monoxide, peroxide, and superoxide.

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**4,591,400**

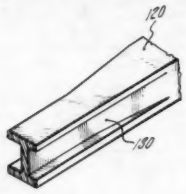
## METHOD OF FORMING A FIBER REINFORCED COMPOSITE ARTICLE OF A COMPLEX CONFIGURATION

**Evan A. Fradenburgh, Fairfield; Edmond F. Kiely, Stratford, and Gordon G. Miller, Shelton, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed May 15, 1984, Ser. No. 610,371**

**Int. Cl.⁴ B29C *65/00***

**U.S. Cl. 156—80** **8 Claims**




3. A method of making a composite article of complex configuration comprising:

(a) forming a lay-up of fiber reinforcing material and uncured matrix material about a mandrel,

(b) chilling the matrix material to a temperature wherein the matrix material is no longer tacky and the mandrel is easily removed from the lay-up,

(c) removing the mandrel from the lay-up,

(d) placing a matched mold about the exterior of the hollow lay-up and forming the lay-up under pressure to conform to the mold, and

(e) curing the matrix material to form the composite article a portion of which is not hollow.

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**4,591,401**

## PROCESS FOR THE DIRECT BONDING OF METAL TO CERAMICS

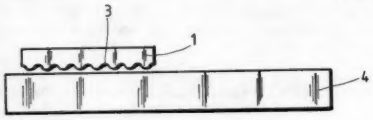
**Arno Neidig, Plankstadt; Klaus Bunk; Karl-Heinz Thiele, both of Worms; Georg Wahl, Eppelheim, and Jens Gobrecht, Gebenstorf, all of Fed. Rep. of Germany, assignors to Brown, Boveri & Cie Aktiengesellschaft, Mannheim, Fed. Rep. of Germany**

**Filed Jun. 28, 1984, Ser. No. 625,722**

**Claims priority, application Fed. Rep. of Germany, Jul. 8, 1983, 3324661**

**Int. Cl.⁴ B32B *31/06, 31/12, 31/22***

**U.S. Cl. 156—89** **4 Claims**




1. A method of bonding a metal component to a ceramic substrate, which comprises, forming a plurality of parallel grooves of a depth and width of 3 to 10 μm on the surface of the metal component which is to be bonded to the ceramic substrate producing a grooved metal surface of enlarged area compared to the area of the surface prior to grooving, thereafter preoxidizing the groove metal surface including the grooves to form an oxide layer covering the grooved metal surface of enlarged area, placing the metal component on the ceramic substrate with the grooved metal surface of enlarged area covered with an oxide layer in contact with the ceramic substrate, and heating the ceramic substrate with the metal component placed thereon to a temperature above the eutectic point of the metal and metal oxide but below the melting point of the metal to effect bonding of the metal component to the ceramic substrate.

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**4,591,402**

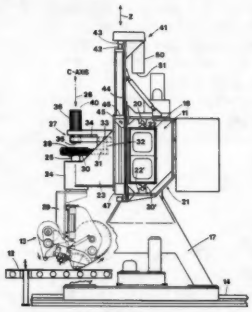
## APPARATUS AND METHOD FOR MANUFACTURING COMPOSITE STRUCTURES

**Charles B. Evans, and William J. Murray, both of Arlington, Tex., assignors to LTV Aerospace and Defense Company, Dallas, Tex.**

**Continuation of Ser. No. 276,441, Jun. 22, 1981, abandoned. This application Jul. 5, 1983, Ser. No. 511,441**

**Int. Cl.⁴ B26D *5/00***

**U.S. Cl. 156—350** **33 Claims**



1. An apparatus for applying a composite tape to a mold, comprising:

a tape dispenser head for dispensing the composite tape;

a mold having a surface adapted for receiving the tape;

gantry means for translating the dispenser head over the mold in a desired pattern;

control means for defining a preselected pattern of tape lengths on the mold surface by activating the dispenser head to cut the tape into lengths corresponding to respective lateral dimensions of a selected pattern;

the tape dispenser head having a supply reel comprising means adapted to receive a composite tape structure having a fibrous tape layer impregnated with an uncured resin, and a backing strip adjacent the fibrous strip; further comprising means having a stylus blade with a cutting edge oriented substantially perpendicularly to the longitudinal axis of the dispensed fibrous tape layer and means for moving the blade across and through the fibrous tape layer and adjacent the backing strip, the means translating the blade comprising means preventing severing of the backing strip.

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**4,591,403**

## PAIL LABELING MACHINE

**Claas Von-Meyer, Hamburg, Fed. Rep. of Germany, assignor to Anker Labelers Corp., Mt. Laurel, N.J.**

**Filed Jun. 1, 1984, Ser. No. 616,288**

**Int. Cl.⁴ B65C *9/04***

**U.S. Cl. 156—364** **6 Claims**

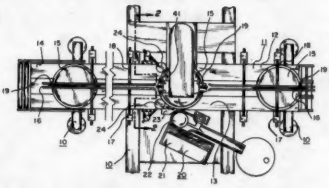
1. A pail labeling machine for applying labels to sides of pails having a bail and the like comprising:

conveyor means for conveying the pail to be labeled from a

loading station to and past a labeling station to a discharge station;

pail stop means located at the labeling station for selectively arresting the pail's movement by the conveyor means;

pail rotation means positioned at the labeling station for



engaging the bail for rotating the pail through a predetermined degree of rotation; and

pail labeling means positioned at the labeling station for dispensing a label into contact with the side of the pail in predetermined time relationship with the operation of the pail rotation means.

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**4,591,404**

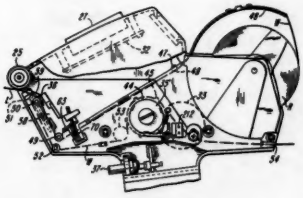
## HAND-HELD ELECTRICALLY SELECTABLE LABELER

**Paul H. Hamisch, Jr., Franklin, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio**

**Division of Ser. No. 512,820, Jul. 11, 1983, Pat. No. 4,497,682, which is a continuation of Ser. No. 268,320, May 29, 1981, abandoned. This application Nov. 19, 1984, Ser. No. 674,105**

**Int. Cl.[4] B41J *3/00*; B41F *1/08***

**U.S. Cl. 156—384** **6 Claims**



1. A hand-held labeler adapted to print and apply pressure sensitive labels releasably secured to a carrier web, comprising: a housing having a handle, a manually engageable actuator disposed at the handle and movable between an initial position and an actuated position, means on the housing for carrying a label roll of pressure sensitive labels, means including an electrically selectable printing head having printing elements for printing on labels, means for delaminating printed labels, means for applying printed labels, a toothed member engageable with tooth engageable means on the carrier web, means for moving the toothed member at a substantially constant rate irrespective of the rate at which the actuator moves between the initial and the actuated positions, the moving means including a drive spring providing the energy for moving the toothed member, and means for operating the printing elements while the toothed member is advancing the carrier web and the labels which it carries.

**4,591,405**

## APPARATUS FOR TRUNCATING CONTINUOUSLY FORMED TUBES

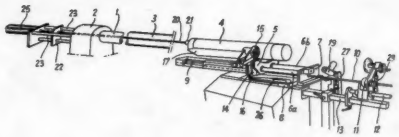
**Jean-Paul Languillat, Vallieres par Thorigny sur Oreuse, France, assignor to Lhomme S.A., Pont sur Yonne, France**

**Filed Apr. 30, 1984, Ser. No. 605,668**

**Claims priority, application France, May 10, 1983, 83 07802**

**Int. Cl.[4] B32B *29/00*, *31/18***

**U.S. Cl. 156—446** **20 Claims**



1. Apparatus for truncating a continuously formed tube into sections of tube, said continuously formed tube being rotated as it is being formed and has a free end that moves forwardly in an axial direction, said apparatus comprising:

(a) a carriage mounted for translation in said axial direction between forward and rearward positions;

(b) abutment means mounted for translation and engageable with the free end of the tube for movement with the tube in a forward direction, said abutment means being actuated by the free end of the tube;

(c) coupling means connecting the carriage to said abutment means for translating said carriage from its rearward position in response to forward movement of the tube;

(d) cutter means mounted on said carriage for selective transverse movement relative to the axis of said tube; and

(e) cam means operatively associated with said cutter means and responsive to forward translation of said carriage for imparting transverse movement to said cutter means into cutting engagement with said tube whereby the tube is truncated.

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**4,591,406**

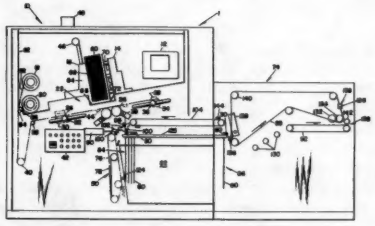
## AUTOMATIC LAMINATOR WITH INTEGRATED PRINTER BUFFER/INTERFACE

**John L. Garber, Fenton, Mo., assignor to Dynachem Corporation, Tustin, Calif.**

**Filed Jan. 25, 1985, Ser. No. 695,018**

**Int. Cl.[4] B32B *31/20***

**U.S. Cl. 156—484** **15 Claims**



1. In combination,

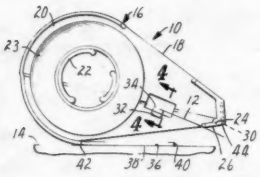
an automatic laminator for laminating, in succession, each of a plurality of panels with photoresist dry film, and

a buffer/interface unit for providing, in a post lamination period, a holding area for the laminated panels with the panels being held substantially vertically suspended in closely spaced relation to allow them to stabilize chemically prior to subsequent processing.

## 4,591,407
## TAPE APPLICATOR

Bruce E. Samuelson, West Lakeland Township, Washington County, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed May 22, 1985, Ser. No. 736,251
Int. Cl.[4] B32B *35/00*
U.S. Cl. 156—527 9 Claims




1. A tape applicator adapted to be hand held and used to apply a length of pressure sensitive adhesive coated tape to a substrate and to cut the applied length from a supply of the tape in the dispenser, said applicator comprising a housing including wall means for defining:

a hub adapted to support a roll of pressure sensitive adhesive coated tape for rotation about an axis;

an anvil spaced from said hub that has a pressure surface generally parallel to the axis of the hub adapted to be manually rubbed along the backing of tape from the roll to firmly press the tape against the substrate while the dispenser is being moved along the substrate, with the tape extending through a predetermined path area in the housing between the roll and the anvil during such rubbing;

a cutting edge projecting generally parallel to the axis on the side of the anvil opposite the hub in a position affording spacing of the edge from tape being pressed against a substrate by the anvil but affording manual pivoting of the housing around the anvil to engage the edge with such applied tape to sever it from tape remaining in the dispenser;

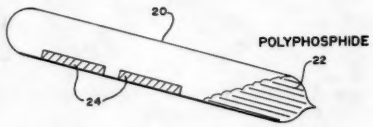
a retainer between said hub and said anvil on the side of said predetermined path area opposite said anvil, said retainer having a retaining surface spaced from said predetermined path area and positioned generally parallel to the axis of the hub so as to be engaged by the pressure sensitive adhesive coating on the tape upon cutting of the tape by said cutting edge to retain the cut end of the tape in position adjacent the anvil so that it can be pressed against and adhered to a new substrate by manual manipulation of the housing, and being positioned so that the pressure sensitive adhesive coating on the tape will be peeled away from said retaining surface when that cut end is adhered to a new substrate and the dispenser is initially moved along the new substrate with the pressure surface pressing the tape into engagement with the new substrate; and

a resiliently flexible elongate support member having a generally planar support surface, a distal end, a proximal end fixed relative to the hub and anvil with said support member on the side of said retainer opposite said predetermined path area, said support surface disposed generally parallel to the axis of the hub, and said distal end projecting generally toward and being spaced from said anvil so that with the support surface along a horizontal substrate in the normal position of said support member said anvil is spaced away from the substrate, and said support member may be resiliently deflected by pressing the housing toward the substrate to bring the anvil into contact with tape being applied to that substrate.

## 4,591,408
## LIQUID PHASE GROWTH OF CRYSTALLINE POLYPHOSPHIDE

Christian G. Michel, Ossining; Henry S. Marek, Mount Vernon, and John A. Baumann, Ossining, all of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 442,208, Nov. 16, 1982, Pat. No. 4,508,931, and a continuation-in-part of Ser. No. 419,537, Sep. 17, 1982, and a continuation-in-part of Ser. No. 335,706, Dec. 30, 1981, abandoned. This application Jun. 29, 1983, Ser. No. 509,158
Int. Cl.[4] C30B *19/00*
U.S. Cl. 156—605 12 Claims




12. A method of growing polyphosphide crystals comprising:

(A) heating a polyphosphide charge of $KP_{15}$ in a sealed vessel in a solventless melt having a temperature substantially within the range of 650° C. to 670° C.; and

(B) slowly cooling said melt to form polyphosphide crystals of $KP_{15}$ from said melt.

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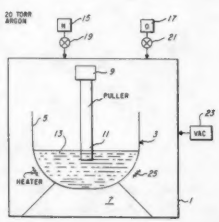
## 4,591,409
## CONTROL OF NITROGEN AND/OR OXYGEN IN SILICON VIA NITRIDE OXIDE PRESSURE DURING CRYSTAL GROWTH

Eva A. Ziem, Garland; Graydon B. Larrabee, Dallas, and David E. Witter, Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed May 3, 1984, Ser. No. 607,107
Int. Cl.[4] C30B *27/02*
U.S. Cl. 156—605 20 Claims




1. A method of forming a single crystal of silicon having substantially uniform physical properties throughout the crystal, comprising the steps of:

(a) providing a silicon melt,

(b) adding a predetermined dopant to said melt,

(c) providing a gas over and in contact with said melt, which gas is chemically related to said dopant, at a continual partial pressure to maintain the melt concentration of said dopant at a substantially fixed value during silicon crystal formation; and

(d) forming a silicon crystal from said melt while said gas is over and in contact with said melt.

## 4,591,410
## METHOD FOR THE PRODUCTION OF MONOCRYSTALLINE $HG_{1-x}CD_xTE$

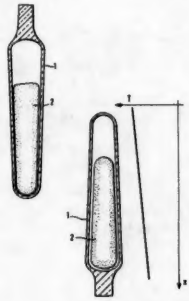
**Johann Ziegler, Heilbronn, Fed. Rep. of Germany, assignor to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany**

**Filed Jun. 19, 1984, Ser. No. 623,132**

**Claims priority, application Fed. Rep. of Germany, Jun. 24, 1983, 3322789**

**Int. Cl.⁴ C30B** *1/06, 29/46*

**U.S. Cl. 156—616 R** **18 Claims**



1. A method for the production of monocrystalline $Hg_{1-x}Cd_xTe$, including the steps of cooling and solidifying a molten mass of a desired composition of $Hg_{1-x}Cd_xTe$ in a closed ampule, and thereafter converting the solidified crystal in the ampule at temperatures below the melting point of the crystal by high temperature recrystallization into the monocrystalline state; and wherein said ampule is of conical longitudinal cross-section having a tip portion, the ampule is not completely filled with the molten mass, the ampule is held during the solidifying of the molten mass such that the molten mass extends from the ampule tip into the interior of the ampule, an undesired pressure is prevented from being exerted on the crystal by the ampule wall during recrystallization by conveying the crystal, which only partially fills the ampule interior, into an ampule area of larger cross-section prior to said step of converting, and the recrystallization process is performed in a temperature zone with a longitudinal temperature gradient that decreases in the direction of increasing ampule cross-section.

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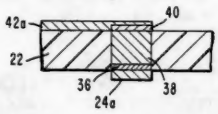
## 4,591,411
## METHOD FOR FORMING A HIGH DENSITY PRINTED WIRING BOARD

**William G. Reimann, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Continuation of Ser. No. 374,837, May 5, 1982, abandoned. This application Jul. 31, 1984, Ser. No. 636,783**

**Int. Cl.⁴ H01L** *21/306, 21/312*

**U.S. Cl. 156—634** **16 Claims**




1. A method capable of forming a printed wiring board layer having feed-through vias of 8 mil and smaller diameter on 12.5 mil centers and interconnections thereamongst, comprising the steps of:

forming holes in a blank having a first conductive cladding on a first side thereof, the holes having diameters corresponding to those of the feed-through conductors, and locations corresponding to where the feed-through conductors are to be located;

placing first resist material on the first cladding for protecting removal thereof;

placing first conductive resist material within the holes and in contact with the cladding, the first conductive resist material comprising a material which is different from that of the first cladding;

placing conductive material within the holes in contact with the first conductive resist material and extending substantially flush with the second side of the blank, the conductive material comprising material which is different from that of, and protected by, the first conductive resist material;

placing second conductive resist material on the conductive material exposed at the second side of the blank for protection of the conductive material, the second conductive resist material comprising a material which is different from that of the conductive material and the first cladding;

placing a second conductive cladding over the second conductive resist material and the second side of the blank, the second conductive cladding comprising a material which is different from that of the second conductive resist material;

removing the first resist material from the first cladding;

placing further resist material on the first and second claddings in a pattern of the interconnections;

removing portions of the first and second claddings not protected by the further resist material without removing the first and second conductive resist materials to form the interconnections; and

removing the further resist material.

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## 4,591,412
## MEANS AND METHOD FOR NEUTRAL SIZING

**Erwin Hechler, Mannheim, Fed. Rep. of Germany, assignor to Giulini Chemie GmbH, Ludwigshafen/Rhein, Fed. Rep. of Germany**

**Filed Dec. 8, 1983, Ser. No. 559,961**

**Claims priority, application Fed. Rep. of Germany, Dec. 8, 1982, 3245390; Oct. 20, 1983, 3338087; Oct. 20, 1983, 3338088**

**Int. Cl.⁴ D21H** *3/02*

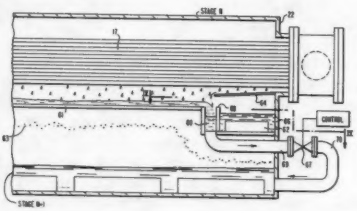
**U.S. Cl. 162—158** **31 Claims**

1. A sizing agent composition of matter for the neutral sizing of paper, paperboard, cardboard and other cellulose containing materials, comprising water, an organic solvent that is unlimitedly miscible with water, a water soluble alkali compound, an alkali aluminate and a sizing component; wherein the alkali compound is present in a sufficient amount to maintain a pH of about 12 in the composition and to completely saponify any fatty acids present, and the alkali aluminate and sizing component are present in amounts of at least 10% by weight and 40% by weight, respectively, based on the total weight of alkali compound, alkali aluminate and sizing component in said composition, and wherein the organic solvent is selected such that the sizing component is completely dissolved and the sizing component is one or more compounds selected from the group consisting of rosins, modified rosins, natural resins, modified natural resins and fatty acids having 12 to 23 carbon atoms, said sizing agent composition being a clear solution.

## 4,591,413
## MULTISTAGE FLASH EVAPORATOR PROVIDING ISOLATION OF IMPURE STAGE DISTILLATE FLOWS FROM THE MAIN DUCT DISTILLATE FLOW

**Ray D. Peterson, Upper Providence Township, Delaware County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jun. 11, 1985, Ser. No. 743,712**
**Int. Cl.[4] B01D** *3/06*
**U.S. Cl. 202—173** **9 Claims**



1. A flash evaporator unit for a multistage flash evaporation plant wherein successive evaporation stages are operated at successively decreasing temperatures and pressures to evaporate water from a brine solution, said evaporator unit comprising:

an elongated enclosure having opposed end walls;

a tube bundle extending between said end walls to provide at least one upper condenser chamber to which vapor is directed from a lower evaporation chamber through which brine flows in the cross-direction;

means including a tray for collecting distillate from said tube bundle;

duct means extending in the cross-direction through successive evaporator units in said plant and disposed to collect distillate from said tray means;

means for holding the tray distillate in a space isolated from said duct means prior to its entry into said duct means;

means for detecting the conduction of the duct distillate outflow from said evaporator unit; and

means for bypassing distillate from said holding space to an evaporation chamber in the same or a subsequent stage so that contaminated distillate can be withheld from the accumulating distillate flow in said duct means when said detecting means indicates said evaporator unit is producing contaminated distillate.

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## 4,591,414
## METHOD OF DETERMINING METHANE AND ELECTROCHEMICAL SENSOR THEREFOR

**Solomon Zaromb, Hinsdale; Takaaki Otagawa, Westmont, and Joseph R. Stetter, Naperville, all of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Aug. 27, 1984, Ser. No. 644,467**
**Int. Cl.[4] G01N** *27/28, 27/52*
**U.S. Cl. 204—1 T** **19 Claims**

1. A methane sensing instrument comprising

an electrochemical cell including a working electrode and a second electrode, and a nonaqueous electrolyte interposed between said two electrodes and in contact with said electrodes,

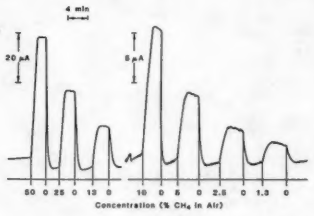
means for applying a voltage above about 1.4 volt versus R.H.E. to the working electrode, said working electrode being capable of oxidizing methane at said voltage,

means for exposing the working electrode to a gas sample, and

means for measuring an electrical signal in one of said electrodes, the signal being generated by a chemical reaction of any methane in said sample coming in contact with and reacting at said working electrode.

16. A method of determining the presence of methane in a gas comprising the steps of

providing an electrochemical cell with a working electrode and a second electrode, and a nonaqueous electrolyte interposed between said two electrodes and in contact with said electrodes,




applying an oxidizing voltage of at least about 1.4 volt versus R.H.E. to the working electrode,

exposing the working electrode to said gas so that methane in said gas reaching said working electrode is oxidized at said voltage thereby generating an electrical signal at the working electrode representative of methane in the gas, and

measuring said signal as an indication of the concentration of methane in said gas.

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## 4,591,415
## PLATING BATHS AND METHODS FOR ELECTRO-DEPOSITION OF GOLD OR GOLD ALLOYS

**Keith J. Whitlaw, Buxton, England, assignor to LeaRonal, Inc., Freeport, N.Y.**

**Continuation-in-part of Ser. No. 682,385, Dec. 17, 1984, abandoned. This application Jun. 11, 1985, Ser. No. 743,259**
**Claims priority, application United Kingdom, Dec. 22, 1983, 8334226**
**Int. Cl.[4] C25D** *3/48, 3/62, 5/02*
**U.S. Cl. 204—15** **21 Claims**

1. An aqueous acid gold electroplating bath for electrodeposition of pure gold or gold alloys comprising a soluble source of gold, at least one bath soluble pyridine carboxylic acid, pyridine thiol, quinoline carboxylic acid, quinoline thiol, or derivatives or mixtures thereof, and, optionally, at least one soluble gold alloying metal.

14. A method for plating electrical components which comprises immersing the portions of the component to be plated in an aqueous acid gold plating bath, and electroplating gold thereon at a current density of from 5 to 100 amps/$dm^2$, said aqueous acid gold plating bath comprising a soluble source of gold, an electrolyte, and at least one bath soluble pyridine carboxylic acid, pyridine thiol, quinoline carboxylic acid, quinoline thiol, or derivatives or mixtures thereof, to increase the maximum current density.

15. The method according to claim 14 wherein the electrical component is a printed circuit board tab.

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## 4,591,416
## CHROMATE COMPOSITION AND PROCESS FOR TREATING ZINC-NICKEL ALLOYS

**Masaaki Kamitani, Tokyo, and Hidenori Tsuji, Kanagawa, both of Japan, assignors to Ebara-Udylite Co., Ltd., Tokyo, Japan**

**Filed Jan. 4, 1983, Ser. No. 455,622**
**Int. Cl.[4] C25D** *11/38;* **C23C** *22/24*
**U.S. Cl. 204—35.1** **4 Claims**

1. A process for forming a colored chromate film on zinc-nickel alloy electrodeposits containing 5% to about 15% by weight nickel which comprises contacting the said zinc-nickel

alloy with a chromating solution comprising at least 0.5 grams per liter hexavalent chromium and sulfate in a weight ratio of $SO_4^{-2}$:$Cr^{+6}$ of about 0.025–1.5:1, which solution has a pH of from about 1.3 to about 2.7 and is substantially free of nitrate ions, and maintaining the solution in contact with the zinc-nickel alloy for a period of time sufficient to form the desired colored chromate film.

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**4,591,417**

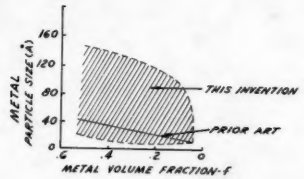
## TANDEM DEPOSITION OF CERMETS

**William J. Kaiser, Farmington Hills, and Eleftherios M. Logothetis, Birmingham, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Continuation of Ser. No. 566,053, Dec. 27, 1983, abandoned. This application Feb. 28, 1985, Ser. No. 706,819**

**Int. Cl.⁴ C23C *14/34***

**U.S. Cl. 204—192 R** **8 Claims**




1. A method of forming a two-phase metal/insulator composite material (cermet) with substantially spherical metal particles uniformly sized to have a narrow size distribution and uniformly distributed in the insulator, said method having separate control of relative metal and insulator composition of the cermet and metal particle size and including the steps of:

sputter depositing a metal on a substrate from a metal deposition source, the amount of metal deposited being from about 0.15 angstroms to about 13 angstroms;

discontinuing sputter deposition of the metal deposition on the substrate before a continuous film of the metal is formed so that at least some of the sputter deposited metal particles, not at the boundary of the substrate, have at least a side portion not touching another sputter deposited metal particle;

sputter depositing an insulator on the substrate from an insulator deposition source the amount of insulator deposited being from 5.5 to 5.6 times the amount of metal deposited during the previous metal deposition;

discontinuing the sputter deposition of the insulator, and

repeating the above steps until the desired film thickness of the cermet is obtained, the metal being deposited in sufficiently small quantities so that only a discontinuous film of the metal is formed, such repetition of the above steps producing uniformly distributed particles of the metal throughout the cermet.

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**4,591,418**

## MICROLAMINATED COATING

**James R. Snyder, Milton, Wis., assignor to The Parker Pen Company, Janesville, Wis.**

**Filed Oct. 26, 1984, Ser. No. 665,436**

**Int. Cl.⁴ C23C *14/00***

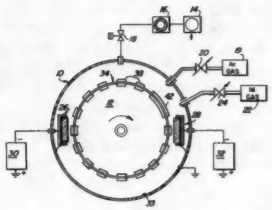
**U.S. Cl. 204—192 P** **21 Claims**

1. A process for coating a thermally resistant substrate with first and second materials selected respectively from a first group consisting of TiN, TaN, ZrN and HfN, and from a second group consisting of Au and an alloy of Au, comprising

the first step of depositing on said substrate a non-opaque layer consisting essentially of one of said first or second materials,

the second step of depositing on said layer of one of said first or second materials a non-opaque layer consisting essentially of the other of said materials,

the third step of depositing on said layer of said other of said materials another non-opaque layer consisting essentially of said one of said first or second materials, and



repeating each of said second and third steps at least once, the layers of said first material having a thickness in the range of 0.01 micrometers to 0.33 micrometers, and the layers of said second material having a thickness in the range of 0.003 micrometers to 0.13 micrometers.

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**4,591,419**

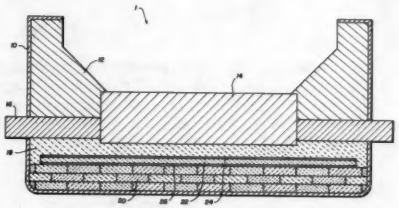
## PROTECTIVE BARRIER FOR ALUMINA REDUCTION CELLS

**Jerris C. Moeller, Franklin County, N.Y.; Douglas V. Stewart, Florence, and Alton T. Tabereaux, Sheffield, both of Ala., assignors to Reynolds Metals Company, Richmond, Va.**

**Filed Sep. 4, 1985, Ser. No. 772,541**

**Int. Cl.⁴ C25C *3/08***

**U.S. Cl. 204—243 R** **11 Claims**



1. In a reduction cell for producing aluminum in which alumina is dissolved in cryolite and electrochemically reduced to aluminum comprising an anode and a cathode, said cathode comprising a steel outer shell, first and second insulation layers on the floor and within said shell, a carbonaceous cathode on said first and second insulation layers, carbonaceous sidewalls within said shell and a barrier layer positioned between said first and said second insulation layers the improvement wherein said barrier layer comprises borosilicate glass which softens and fuses into a monolithic layer during start-up of said cell and which has a flow point higher than the operating temperature of said cell.

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**4,591,420**

## METHOD AND APPARATUS FOR IMPROVING ELECTROPLATING AND PAINTING RACKS

**Samuel L. Van Horn, 2270 S. High St., Columbus, Ohio 43207**

**Filed Oct. 1, 1984, Ser. No. 656,253**

**Int. Cl.⁴ C25D *17/04*; A47H *1/16***

**U.S. Cl. 204—297 W** **8 Claims**

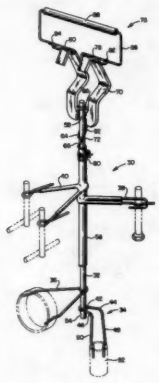
1. A method for making a rack for use in electroplating objects, comprising the steps of:

providing a central support rod of electrically conductive

material having a length and a substantially circular cross-section;

disposing on one end of said central support rod means for connection to a D.C. power source;

disposing along the length of said central support rod at least one retaining tip spaced apart from said means for electrical connection, said retaining tip being made of an electrically conductive spring material having two arm members one joined to the other at one end by a circular wound helical spring, the inside rest diameter of the circular wound helical spring being less than the outside diameter of said circular cross-sectioned central support rod, the other end of said arm members bearing support means configured to hold at least one of said objects, said central support rod being disposed within the circular wound helical spring of said retaining tip and being in frictional



contact therewith sufficient to prevent said retaining tip from moving relative to said central support rod prior to mounting said objects on said arm member support means, said retaining tips are disposed about said central support rod by moving said arms apart angularly about said helical winding to expand open the inside diameter of said winding sufficient to allow insertion of said rod, when said retaining tip with inside diameter expanded open is located properly along the length of said rod, said arms are released thereby closing said helical winding tightly about said rod, said arms being then angularly displaced relative to their rest positions, said helical spring winding being maintained at a larger inside diameter than said inside rest diameter by the surface of said central support rod, thereby forming an electrical connection between said retaining tip and said central support rod.

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**4,591,421**

## AIR/FUEL RATIO DETECTOR

**Tetsusyo Yamada, and Shintaro Hirate, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan**

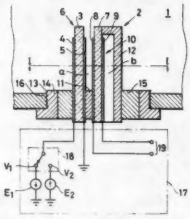
**Filed Dec. 13, 1984, Ser. No. 681,336**

**Claims priority, application Japan, Dec. 15, 1983, 58-237623**

**Int. Cl.[4] G01N *27/58***

**U.S. Cl. 204—406** **15 Claims**

1. An A/F ratio detector comprising: a solid-electrolyte oxygen pump element and a solid-electrolyte oxygen-concentration-difference-actuated electrochemical cell sensor element, each element being in the form of an oxygen-ion-conductive solid electrolyte having a porous electrode formed on both sides thereof, said electrochemical cell sensor element being disposed to face said pump clemcnt with a small gap therebetween, means for defining an air compartment open to the atmosphere on a side of said sensor element opposite said small gap, and means for passing an electric current through said




pump element, a resulting output from said sensor element providing an output signal indicative of an air/fuel ratio.

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**4,591,422**

## ELECTROCHEMICAL OXYGEN SENSOR

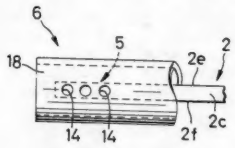
**Nobuhide Kato, Aichi, and Takao Murase, Konan, both of Japan, assignors to NGK Insulators, Ltd., Japan**

**Filed Mar. 8, 1985, Ser. No. 709,803**

**Claims priority, application Japan, Mar. 16, 1984, 59-38404[U]**

**Int. Cl.[4] G01N *27/04, 27/58***

**U.S. Cl. 204—426** **5 Claims**



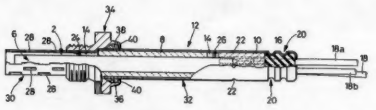

1. An oxygen sensor including a planar oxygen sensing element including a first side surface having a thickness and a second side surface of substantially equal thickness, and an oxygen detecting portion located at one end thereof, and further including a protective covering enclosing the sensing element to protect at least the detecting portion, said oxygen detecting portion having thereon an oxygen detecting member which is exposed to a measurement gas, said sensing element having opposite primary surfaces which are larger in area than said first and second side surfaces thereof, said detecting member being disposed on a side of one of said primary surfaces, wherein the improvement comprises:

a first plurality of fluid-path apertures formed through said wall of said protective covering and facing said first side surface and a second plurality of fluid-path apertures formed through said wall of said protective covering and located opposite to said first plurality of fluid-path apertures, said second plurality of fluid-path apertures facing said second side surface, each of said first and second plurality of fluid-path apertures being smaller in size than said thickness of said first and second side surfaces to prevent said measurement gas from flowing directly onto said detecting member.

## 4,591,423
## OXYGEN SENSOR

Nobuhide Kato, Aichi, and Takao Murase, Konan, both of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Mar. 8, 1985, Ser. No. 709,801
Claims priority, application Japan, Mar. 16, 1984, 59-38407[U]; Aug. 29, 1984, 59-131505[U]
Int. Cl.[4] G01N *27/04, 27/58*
U.S. Cl. 204—428 16 Claims



16. An oxygen sensor for determining an oxygen partial pressure of a measurement gas in a measurement-space, comprising:

an elongate oxygen sensing element having an oxygen detecting portion adjacent to one longitudinal end thereof;

first protective covering means for protecting at least an end portion of said sensing element which is located within said measurement-gas space and exposed to said measurement gas; said sensing element including said oxygen detecting portion;

second protective covering means for covering a portion of said sensing element which is not exposed to said measurement gas;

a retainer housing for supporting said sensing element, said first protective covering means and said second protective covering means such that said end portion of the sensing element is located within said measurement-space, said retainer housing having a bore formed therethrough; and

said first and second protective covering means consisting of an integral protective tubing member which is formed from a single tubular member and which is supported by said retainer housing, said protective tubing member extending through said bore of the retainer housing with additional means to provide fluid tightness therebetween and accommodating said oxygen sensor element in said protective tubing member.

## 4,591,424
## METHOD OF PREPARING CARBONACEOUS PITCH

Shimpei Gomi, Tokyo; Tomio Arai, Zushi; Fumio Mogi, Tokyo; Takao Nakagawa, Ichikawa; Kunio Miura, Chiba, and Sugio Otani, Kiryu, all of Japan, assignors to Fuji Standard Research, Inc., Tokyo, Japan

Filed May 17, 1984, Ser. No. 611,072
Claims priority, application Japan, Feb. 13, 1984, 59-24679
Int. Cl.[4] C10C *3/18*
U.S. Cl. 208—40 16 Claims

1. A method of preparing an optically isotropic carbonaceous pitch which is convertible inot optically anisotropic pitch when subjected to shear forces, said method comprising the steps of:

providing a raw material oil comprising at least 45% of a residual oil having a boiling point of 350° C. or more and obtained from fractionation of a naphthene base petroleum crude, said napbtbene base petroleum crude having a characterization factor K of between 11.0 and 11.5, said factor K defined as:

$$K = \sqrt[3]{T_B}\ /S$$

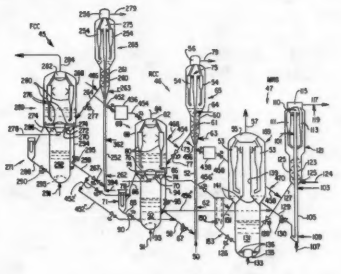
wherein $T_B$ is the molar average bioling point in Rankine (° F.+460) and S is the specific gravity at 60° F. of the distillate;

thermally cracking said raw material oil in a reaction zone to remove light hydrocarbon components and to obtain a pitch product containing 5–40 weight % of mesophase and not more than 10 weight % of light hydrocarbon components with a bioling point at 60 mmHg (absolute) of 300° C. or less and having a softening point of between 160° and 220° C.; and removing the mesophase from said pitch product to obtain a substantially mesophase-free carbonaceous pitch as said optically isotropic pitch.

## 4,591,425
## CASCADING OF FLUID CRACKING CATALYSTS

Stephen M. Kovach, and Charles B. Miller, both of Ashland, Ky., assignors to Ashland Oil, Inc., Ashland, Ky.

Filed Dec. 14, 1984, Ser. No. 681,738
Int. Cl.[4] C10G *51/02*
U.S. Cl. 208—74 11 Claims



1. A process for conversion of hydrocarbon feestocks by cascading a cracking catalyst containing zeolite in an acidic matrix from one hydrocarbon processing unit to another, wherein there are at least three different interconnected hydrocarbon processing units comprising a first unit having a regeneration zone and a riser zone, a second unit having a regeneration zone and and a riser zone, and a third unit having a riser zone and a regeneration zone, each unit having different processing conditions; said process comprising:

A. contacting a feedstock in said riser zone of said first unit with a catalyst to oil ratio in the range of about 3:1 to 7:1, at a temperature in the range of about 468°–566° C. (about 875°–1050° F.), and at a pressure in the range of about 5–75 psig, for a period of time sufficient to convert per pass at least 50% by volume, based on total volume of said feedstocks said feedstock having about 0–10 volume % hydrocarbons boiling above 566° C. (1050° F.), no more than five ppm Ni+V, and a Conradson carbon value less than about 2 with a cracking catalyst containing zeolite in an acidic matrix to produce useful products and a carbonaceous coated cracking catalyst;

B. separating said products from said carbonaceous coated cracking catalyst; regenerating in said regeneration zone of said first unit said carbonaceous coated cracking catalyst to remove at least a portion of carbonaceous deposits therefrom and recycling said regenerated catalyst to said riser zone of said first unit until inventory catalyst in said first unit reaches an equilibrium state characterized as a metals content Ni+V in the range of about 1,000 to about 5,000 parts per million based on total weight of said catalyst, and an MAT activity in the range of about 65 to 85;

D. removing at least a portion of said catalyst inventory from said first unit and transferring it to said second unit;

E. contacting a feedstock in said riser zone of said second unit with a material comprising at least in part said portion of said catalyst from inventory of said first unit transferred to inventory of catalyst in said second unit at a temperature in the range of about 482° to 566° C. (about 900° to 1050° F.), at a pressure in the range of about 5 to 75 psig,

for a period of time sufficient to convert per pass at least 50% by volume, based on the total volume of a feedstock, said feedstock having at least 10% by volume, based on total volume of said feedstock, of hydrocarbons boiling at greater than 566° C. (1050° F.) at atmospheric pressure with at least 10 ppm Ni and V, and a Conradson carbon in the range of about 1–10 to form products and a contaminated material coated with carbonaceous deposits;

F. separating said products from said contaminated material;

G. regenerating said contaminated material in the regeneration zone of said second unit by removing at least a portion of said carbonaceous deposits and recycling at least a portion thereof back to said riser zone of said second unit until inventory of material in said second unit, including material transferred from said first unit to said second unit, after regeneration has the following characteristics: an MAT value in the range of about 40 to 70, and a total metals content of Ni+V in the range 5,000 to 30,000 ppm;

H. removing at least a portion of said inventory from said second unit and transferring it to said third unit;

I. contacting a feedstock in the riser zone of said third unit with a material comprising at least in part said portion of said catalyst from inventory of said second unit which has been transferred to said third unit at a temperature and a pressure for a period of time not to exceed 10 seconds per pass sufficient to remove at least 70% by weight of metals, based on total weight of metals, and at least 50% by weight of Conradson carbon precursors, said feedstock having a Conradson carbon content greater than about 8, and more than about 100 ppm Ni+V, based on total weight of feedstock, and having less than 50% by volume of hydrocarbons boiling below about 566° C. (about 1050° F.), to form products and a contaminated material coated with carbonaceous deposits;

J. regenerating said contaminated material of said third unit in said regeneration zone of said third unit by removing at least a portion of the carbonaceous deposits thereof and recycling at least a portion thereof back to said riser zone of said third unit until inventory of material in said third unit including material transferred from said second unit to said third unit, after regeneration has the following characteristics: at least a total metals content of Ni+V, based on total weight of the material, of about 15,000 ppm and a MAT of at least 20; thereafter replacing at least a portion of the catalyst in said third unit so as to maintain such characteristics.

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**4,591,426**

## PROCESS FOR HYDROCONVERSION AND UPGRADING OF HEAVY CRUDES OF HIGH METAL AND ASPHALTENE CONTENT

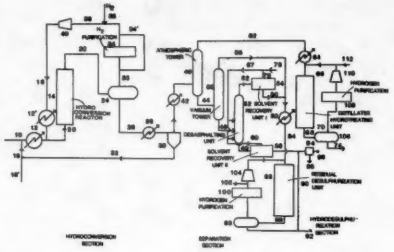
**Julio H. Krasuk, Caracas; Fernando J. Silva, Miranda; Roberto E. Galiasso, Miranda, and Alfredo Souto, Miranda, all of Venezuela, assignors to Intevep, S.A., Caracas, Venezuela**

**Continuation-in-part of Ser. No. 309,798, Oct. 8, 1981, abandoned. This application Mar. 28, 1983, Ser. No. 479,394**

**Int. Cl.[4] C10G** *47/04, 65/12, 67/04*

**U.S. Cl. 208—96** **29 Claims**

1. The process for hydroconverting a heavy hydrocarbon feedstock containing at least 200 ppm metals, having less than 20% API gravity and more than 8% Conradson carbon, which comprises contacting said feedstock in a hydroconversion reaction zone with hydrogen in the presence of a natural inorganic material as a catalyst, said inorganic material being selected from the group consisting of (1) iron laterite having a chemical formula consisting essentially of $((\gamma FeOOH \cdot (1-\gamma) Fe_2O_3 \cdot nH_2O\ \alpha AlO(OH))\ (SiO_2)_x\ (FeTiO_3)_y\ (TiO_2)_z$ with $\gamma$ much greater than $(1-\gamma)$) with a $Fe_2O_3$ content of greater than or equal to 45.0 wt. %, (2) limonite having a chemical formula consisting essentially of $((\gamma Fe_2O_3 \cdot nH_2O)\ (1-\gamma)\ Fe_3(PO_4)_2 \cdot 8\text{-}H_2O\ \alpha Al_2O_3 \cdot nH_2O\ (SiO_2)_x$ with $\gamma$ much greater than $(1-\gamma)$)



with an $Fe_2O_3$ content of greater than or equal to 45.0 wt. %, and (3) mixtures thereof.

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**4,591,427**

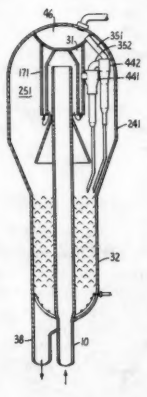
## METHOD FOR VAPOR RECOVERY FOR FLUIDIZED CATALYTIC CRACKING PROCESSES

**Russell R. Krug, San Rafael, and Frederick A. Pettersen, Novato, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 444,328, Nov. 24, 1982, abandoned. This application Jan. 16, 1985, Ser. No. 692,443**

**Int. Cl.[4] C10G** *11/18;* **F27B** *1/20*

**U.S. Cl. 208—161** **8 Claims**




1. In a fluid catalytic cracking system wherein hydrocarbon vapors are substantially disengaged from a reaction mixture of catalyst and hydrocarbon vapor by downward discharge from a riser reactor into a large diameter vessel forming a separation chamber and said vapors are further separated from said catalyst by passage through at least one cyclone prior to recovery of said vapors from said separation chamber, the improvement comprising

venting the hydrocarbon vapor into at least one said cyclone which is positioned in said vessel through a separate confined chamber forming a vapor recovery zone substantially smaller in diameter than said separation chamber and formed generally concentric with said riser reactor and surrounded by the upper portion of said separation chamber wherein the direction of vapor flow into said vapor recovery zone is at an angle substantially greater than perpendicular to the downward flow of the reaction mixture being discharged into said separation chamber

from said riser reactor and wherein the separated catalyst forms a bed in the bottom portion of the separation chamber and below the vapor recovery zone.

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**4,591,428**

## CONTINUOUS PROCESS FOR THE CATALYTIC TREATMENT OF HYDROCARBON OILS

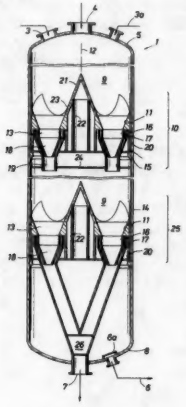
**Gerrit J. Pronk, The Hague, Netherlands, assignor to Shell Oil Company, Houston, Tex.**

**Filed Mar. 1, 1984, Ser. No. 707,280**

**Claims priority, application United Kingdom, Mar. 1, 1984, 8405381**

**Int. Cl.[4] C10G *45/18, 49/22;* B01J *8/12***

**U.S. Cl. 208—165** **10 Claims**



**1.** A continuous process for the catalytic hydrotreatment of a hydrocarbon oil which comprises passing said hydrocarbon oil through at least one catalyst bed within a reactor vessel wherein catalyst and hydrocarbon oil are passed into the top part of said vessel and wherein catalyst and hydrotreated hydrocarbon oil product are individually withdrawn from the bottom of the reactor vessel respectively through a catalyst outlet and a hydrotreated hydrocarbon oil outlet, wherein said catalyst outlet comprises a discharge funnel to allow separation of said hydrotreated hydrocarbon oil from said catalyst by passing said catalyst and said hydrotreated hydrocarbon oil through a first main screen of said funnel to separate said catalyst from said hydrotreated hydrocarbon oil and passing said hydrotreated hydrocarbon oil derived from said first main screen through a second screen in said discharge funnel positioned substantially parallel to said first main screen, wherein said second screen has apertures therein of greater mesh size than the mesh size of said first main screen to allow separation of said hydrotreated hydrocarbon oil from any broken and/or smaller particles of catalyst contained in said hydrotreated hydrocarbon oil derived from said first screen and to form a relatively catalyst particle-free stream of hydrotreated hydrocarbon oil for withdrawal from said hydrotreated hydrocarbon oil outlet in said bottom of said reactor vessel.

**4,591,429**

## HYDROTREATING PROCESS EMPLOYING CATALYSTS COMPRISING A SUPPORTED MIXTURE OF A SULFIDE OF A PROMOTER METAL, TRIVALENT CHROMIUM AND MOLYBDENUM OR TUNGSTEN

**Teh C. Ho, Bridgewater; Archie R. Young, II, Montclair; Russell R. Chianelli, Somerville, and Allan J. Jacobson, Princeton, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.**

**Filed Sep. 28, 1984, Ser. No. 656,132**

**Int. Cl.[4] C10G *45/08, 49/04***

**U.S. Cl. 208—254 H** **17 Claims**

**17.** A process for improving the oxidation stability of a nitrogen and sulfur containing lube oil feed which comprises contacting said feed at an elevated temperature of at least about 150° C. and in the presence of hydrogen with a catalyst comprising a support mixture of a sulfide of (i) trivalent chromium, (ii) Mo, W or mixture thereof and (iii) at least one promoter metal selected from the group consisting of Ni, Co, Mn, Cu, Zn and mixture thereof and mixture thereof with Fe wherein said catalyst has been prepared by compositing a pre-selected quantity of inorganic refractory oxide support material with (a) a hydrated oxide of trivalent chromium and (b) one or more catalyst precursor salts containing a thiometallate anion of Mo, W or mixture thereof and a cation containing at least one of said promoter metals wherein said promoter metal in said cation is divalent and is chelated by at least one neutral, nitrogen-containing polydentate ligand and heating said composite at elevated temperature, in the presence of sulfur or sulfur bearing compound and under oxygen-free conditions for a time sufficient to form said catalyst, said contacting of said feed with said catalyst occurring for a time sufficient to improve the oxidation stability of said oil.

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**4,591,430**

## PROCESS FOR THE DENITROGENATION OF NITROGEN-CONTAINING HYDROCARBON COMPOUNDS

**Carl W. Hudson, Baton Rouge, La., assignor to Exxon Research and Engineering Co., Florham Park, N.J.**

**Continuation-in-part of Ser. No. 611,859, May 18, 1984, abandoned. This application Jul. 31, 1985, Ser. No. 760,871**

**Int. Cl.[4] C10G *45/04***

**U.S. Cl. 208—254 H** **27 Claims**

**11.** A process for the denitrogenation of a feed comprising a nitrogen-containing hydrocarbon compound containing a carbon-nitrogen bond, which comprises: contacting said feed, in the presence of hydrogen, over

(i) a bulk iron catalyst which contains at least 50 percent elemental iron, based on the weight of the catalyst, and one or more alkali or alkaline-earth metals, or

(ii) an iron catalyst wherein the iron is dispersed upon an inorganic oxide support, the catalyst containing at least about 0.1 percent iron, based on the total weight of the catalyst, the supported metallic component containing at least 50 percent iron, exclusive of the support component, or components, of the catalyst, and one or more alkali or alkaline-earth metals,

at a temperature ranging from about 225° C. to about 430° C. and hydrogen partial pressure ranging from about 0 psig to about 1000 psig sufficient to cleave the carbon-nitrogen bond of said nitrogen-containing hydrocarbon compound and denitrogenate said nitrogen-containing hydrocarbon compound.

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**4,591,431**

## PROCESS FOR SEPARATING POROUS MATERIALS FROM LESS POROUS MATERIALS

**Rabindra K. Sinha, 103 Lansdowne Dr., Coraopolis, Pa. 15108**

**Filed Oct. 9, 1984, Ser. No. 658,627**

**Int. Cl.[4] B03B *5/28***

**U.S. Cl. 209—3** **3 Claims**

**1.** A process for separating a porous coal component from a

nonporous gangue component in a mixture comprising the steps of;

(a) drying the mixture and allowing said mixture to cool to a predetermined temperature,

(b) contacting the cooled coal mixture with carbon dioxide gas at a second predetermined temperature and pressure for a time sufficient to adsorb the gas into the porous coal component in an amount significantly greater than the amounts of atmospheric air that the coal would adsorb at said second predetermined temperature and pressure,

(c) Feeding the contacted mixture into a parting liquid of a preselected specific gravity sufficient to effect separation of the porous coal component from the nonporous gangue component wherein the temperature and pressure of the liquid is such so as to cause desorption of the contacting gas from the porous component,

(d) maintaining the viscosity and surface tension of the parting liquid such that the desorbed gas from the coal component remains attached to said coal particle peripheral surface to effectuate separation thereof, in said parting liquid,

(e) separating said porous coal component from said nonporous gangue in said parting liquid, and

(f) recovering a separated coal fraction at the liquid surface from the remaining nonfloating coal and gangue,

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**4,591,432**

**SIEVING APPARATUS**

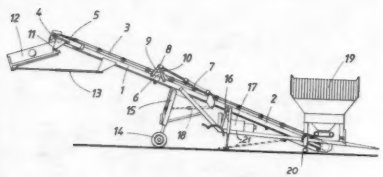
**Franz Hartl, A-4482 Ennsdorf, Austria**

**Filed Jun. 11, 1984, Ser. No. 619,031**

**Claims priority, application Austria, Jan. 25, 1984, 252/84**

**Int. Cl.[4] B65G *21/14;* B07B *1/46***

**U.S. Cl. 209—247** **4 Claims**



1. In sieving apparatus comprising:

an undercarriage,

a belt conveyer having a frame comprising first and second frame sections and a hinge connecting said first and second frame sections at a hinge axis, said first frame section being pivotally movable about said hinge from an operating position in which said frame is extended to a travel position in which said first frame section extends close to and along said second frame section above the latter, said first frame section having a free end remote from said hinge which constitutes a discharge end of said conveyer, and

a sieving machine comprising a sieve which is adapted to be driven and is pivoted to said first frame section near said discharge end on an axis which is transverse to the longitudinal direction of said frame,

the improvement residing in that

first hydraulic cylinder-piston means are provided for pivotally moving said sieve about said transverse axis,

second hydraulic cylinder-piston means are provided for moving said first frame section about said hinge between said operating position and said travel position,

first and second links are provided, each of which has first and second ends, said first and second links being pivoted at their first ends to said first and second frame sections, respectively, at a distance from said hinge, and being pivoted to each other at their second ends which are disposed above said second frame section, and

said second cylinder-piston means are pivoted at one end to at least one of said first and second links adjacent to said second end thereof and are pivoted at the other end to said second frame section at a location on an opposite side of said first end of said second link across said hinge, said undercarriage consisting of a one-axle undercarriage comprising wheels and struts which carry said wheels are pivoted to said second frame section and pivotally movable about a transverse axis which is parallel to said hinge axis and spaced from an opposite end of said second frame section remote from said hinge and from said hinge,

means being provided which define for said struts an upstanding position in which said struts extend substantially at a right angle to said second frame section, and a travel position, in which said wheels are nearer to said second frame section and to said opposite end thereof than when said struts are in said upstanding position, said wheels lying beneath said sieving machine when said sieving machine is swung to overlie said first frame section in said travel position thereof,

hydraulic piston-cylinder means being provided for moving said struts between said upstanding and travel positions,

said second frame section is formed at the end which is opposite to said hinge to constitute a supporting foot adapted to support said sieving apparatus when said frame is extended, and

additional downwardly extending struts are connected to said second frame section between said opposite end and said undercarriage and consist of hydraulic cylinder-piston units which are extensible as far as to the ground and to move said belt conveyer to a position in which said undercarriage is pivotally movable when said first frame section is in said travel position.

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**4,591,433**

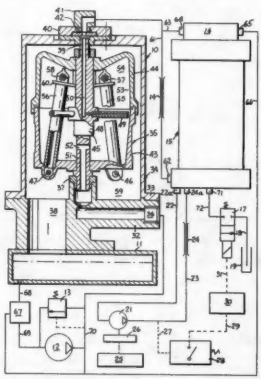
**AUTOMATIC CONTROLS OF WATER-OIL SEPARATING SYSTEM FOR USE WITH CENTRIFUGAL TYPE SEPARATOR**

**Tadeusz Budzich, Moreland Hills, Ohio, assignor to Fluid Power Components, Inc., Cleveland, Ohio**

**Continuation-in-part of Ser. No. 629,907, Jul. 11, 1984, Pat. No. 4,534,860. This application Jun. 18, 1985, Ser. No. 746,132**

**Int. Cl.[4] B01D *33/04;* B04B *9/06***

**U.S. Cl. 210—114** **11 Claims**



1. A centrifugal filter separator system comprising a stationary housing having an inlet port supplied with pressurized oil by a pump having a suction port connected to a reservoir, a clean oil outlet port connected to said reservoir, a centrifuged water port, and a rotatable drum Journalled in said housing and functionally connected with said inlet port, said clean oil outlet port and said centrifuged water port, gravity type separating means interconnected to said centrifuged water port operable to separate by gravity oil-water mixture into oil and water, oil conducting means operable to conduct separated oil from said

gravity type separator to said reservoir, water level sensing means operable to sense the level of water separated in said gravity type separating means, and separated water ejecting means having means responsive to said water level sensing means, said separated water ejecting means operable to regulate the quantity of water in said gravity type separating means.

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**4,591,434**

## ADVANCED DUAL FILTERING APPARATUS

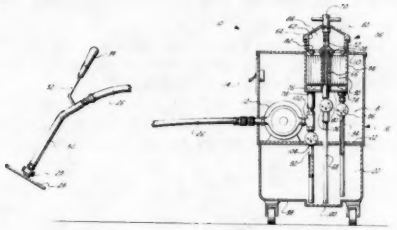
**Malcolm H. Prudhomme, P.O. Box 510, Sunset, La. 70584**

**Continuation-in-part of Ser. No. 432,009, Sep. 30, 1982, Pat. No. 4,517,082. This application Oct. 22, 1984, Ser. No. 663,417**

**The portion of the term of this patent subsequent to May 14, 2002, has been disclaimed.**

**Int. Cl.[4] B01D** *29/24*

**U.S. Cl. 210—117** **14 Claims**



1. A dual filtering apparatus for filtering and purifying contaminated oil used in a deep-fat frying vat, comprising:

a tub;

a remote filtering screen attached to the tub by a external conduit through which the oil is conveyed from the frying vat, the remote filtering screen being adapted for placement in the vat and providing partial filtering of the oil before it is conveyed to the tub;

a fine filtering assembly carried by the tub and comprising a generally cylindrical canister having a cap covering the canister on its top, the cap having an annular depending skirt that fits into the interior of the canister;

a central conduit through a portion of the canister and in fluid communicating relationship with the tub;

a perforated, lower retainer plate disposed around the central conduit and forming together with a bottom and side walls of the cannister a lower sediment area;

a perforated upper retainer plate disposed around the central conduit forming together with the cap an upper void area, the central conduit being in fluid communicating relationship with the upper void area;

a fine filter means mounted in surrounding relationship to the central conduit between the lower and upper plates, upward displacement of the filter means being prevented by the upper plate which is held against the fine filter means by the depending skirt of the cap;

an inlet conduit through the bottom of the canister through which partially filtered oil is conveyed from the external conduit to the lower sediment area and through the fine filter means;

an overflow conduit through the bottom of the canister, the conduit being provided with a pressure relief valve which opens in response to an increase of pressure in the lower sediment area;

a means for drawing oil through the external conduit and forcing it into the inlet conduit, through the fine filter means, into the central conduit and thence to the tub;

means for drawing oil from the tub and expelling it through the external conduit into the vat.

**4,591,435**

## FILTER PRESS

**Pavel P. Pryadkin, ulitsa Universitetskaya, 9, kv. 44; Leonid P. Pertsev, ulitsa Askharova, 9, kv. 27; Viktor S. Ziborov, ulitsa Geroev truda, 30, kv. 80; Alexandr F. Pichakhchi, ulitsa Pushkinskaya, 32, kv. 28; Alexandr A. Malyshkin, ulitsa Petrozavodskaya, 31/19, kv. 1, and Vladislav N. Onufriev, ulitsa Tankopia, 35, kv. 84, all of Kharkov, U.S.S.R.**

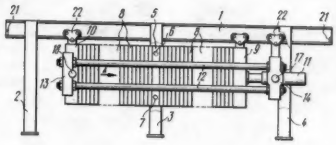
**PCT No. PCT/SU83/00017, § 371 Date Aug. 22, 1984, § 102(e) Date Aug. 22, 1984, PCT Pub. No. WO84/02477, PCT Pub. Date Jul. 5, 1984**

**PCT Filed Jun. 13, 1983, Ser. No. 648,160**

**Claims priority, application U.S.S.R., Dec. 24, 1982, 3522052**

**Int. Cl.[4] B01D** *25/15*

**U.S. Cl. 210—230** **13 Claims**



1. A filter press comprising:

a frame mounted on posts,

a thrust plate secured on the posts in a mid-section of the frame,

filter plate assemblies arranged on either side of the thrust plate,

clamping means for clamping the filter plate assemblies, said clamping means including pressure plates, a drive, and braces for the drive to act on the pressure plates,

said braces being movable both horizontally along the longitudinal centerline of the filter press and vertically relative to said longitudinal centerline, and being pivotably connected by its ends to said drive and at its other ends to the pressure plate, and

a retractable hinge pin means mounted on said pressure plate for connecting said other ends of said braces to said pressure plate.

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**4,591,436**

## APPARATUS FOR SEPARATION OF SUSPENSIONS FROM A FLUID UNDER PRESSURE

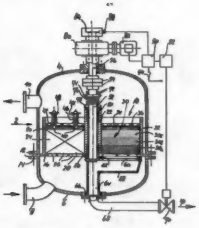
**Johannes M. Hofstede, Berkel & Rodenrijs, Netherlands, assignor to Cojafex B.V., Rotterdam, Netherlands**

**Filed Dec. 16, 1982, Ser. No. 450,422**

**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1981, 3151189**

**Int. Cl.[4] B01D** *29/08, 29/38*

**U.S. Cl. 210—264** **35 Claims**



1. Filter apparatus for the separation of suspended solids from a fluid under pressure, comprising: a housing having a fluid inlet and a fluid outlet; a filterbed, composed of a granular medium which is of at least two grain sizes and which does not swell during filtering, said filterbed being disposed in said housing between said inlet and said outlet so that, during the

filtration process the fluid can flow in one direction through said filter bed and so that collected suspended solids can be removed from the filterbed during a backwash operation with a flow of wash-fluid in the reversed direction through the filterbed, said granulate filterbed being composed such that the granulates are straticulate in one or more sequences according to grain size with said grain size diminishing in the direction of flow of of the fluid to be filtered during the filtration process; and self-adjusting pressure source means for providing a continuous compression force on said granulate bed, so that said filterbed, during the filtration as well as during the backwash process, is held together with the relationship of the granulates to one another remaining substantially permanently the same under the influence of filtration and backwash flows.

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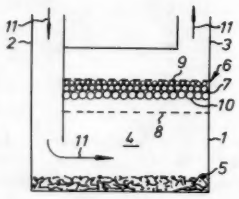
**4,591,437**

## APPARATUS FOR SEPARATING SOLID PARTICLES FROM A LIQUID

**Leif W. Ernryd, Jämjösiätt; Vlastimil Carbol, and Paul Carbol, both of Växjö, all of Sweden, assignors to Leif Ernryd AB, Jämjösiätt, Sweden**

**Filed Jun. 1, 1983, Ser. No. 499,890**
**Claims priority, application Sweden, Jun. 4, 1982, 8203454**
**Int. Cl.[3] B01D** *23/10*
**U.S. Cl. 210—265** **10 Claims**




1. An apparatus for separating solid particles, such as amalgam waste, from the waste water from dentists' surgical units, said apparatus comprising a separation container (1) having an inlet (2) for liquid containing solid particles and an outlet (3) for purified liquid from which solid particles have been separated, at least one filter body (6, 13) through which the liquid flows and which consists of a filter medium enclosed between two perforated walls (8, 9), and at least one sedimentation zone (4, 12) for the sedimentation of solid particles, characterised in that the filter medium of at least one of said filter bodies consists of balls (10) of alumina having a diameter of 0.05–15 mm, said balls having a density such that they either float in or are carried along by the liquid flowing through the filter body (6, 13), and said balls (10) being present in such an amount that they take up a total volume which is sufficiently less than the total volume of the space between said perforated walls (6, 13) as to leave a region of said space devoid of said filter medium, and said balls (10) filling out at least the cross-sectional area of the filter body (6, 13) through which the liquid flows.

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**4,591,438**

## WATER PURIFIER

**Masatoshi Tanabe, Hitachiota, and Kenzo Mikata, Hitachi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 27, 1985, Ser. No. 706,180**
**Claims priority, application Japan, Feb. 27, 1984, 59-34254**
**Int. Cl.[4] B01D** *23/26, 27/02*
**U.S. Cl. 210—282** **8 Claims**

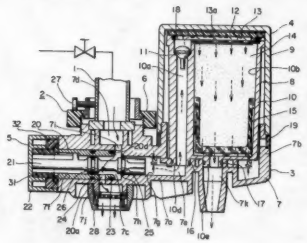
1. A water purifier including a body section, a cartridge section for purifying water, and a spool section, comprising:

a horizontal water passage which is provided in a main body constituting said body section and which has a large-diameter portion opened to the outside of said main body and a small-diameter portion connected to said cartridge section;

a vertical water passage which is provided in said main body in communication with said large-diameter portion;

a spool sleeve which is disposed within said large-diameter portion; and

a spool body including an "O" ring which is provided such as



to change the direction of flow of said horizontal water passage by selectively coming into contact with a continuous portion leading from said large-diameter portion to said small-diameter portion and said spool sleeve, without being brought into contact with the edges which communicate said vertical water passage with said large-diameter portion.

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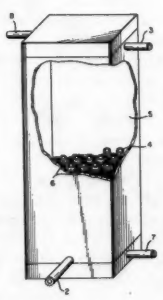
**4,591,439**

## ION EXCHANGE PROCESS AND APPARATUS

**Walther G. Grot, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 608,649, May 8, 1984, abandoned. This application Aug. 13, 1985, Ser. No. 765,121**
**Int. Cl.[4] B01J** *39/04, 47/12*
**U.S. Cl. 210—638** **5 Claims**



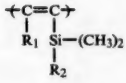
1. A nonelectrolytic cation exchange device having at least two compartments separated by a cation exchange membrane, at least a first one of the compartments being substantially filled with a particulate cation exchange resin and at least a second one of the compartments being substantially free from particulate cation exchange resin, means for continuously passing an ion-containing solution into and through the first compartment and means for continuously passing a regenerant solution into and through the second compartment.

## 4,591,440
## MEMBRANES FOR LIQUID SEPARATIONS

Toshinobu Higashimura, Kyoto, and Toshio Masuda, Ohtsu, both of Japan, assignors to Toray Industries, Incorporated, Tokyo, Japan

Filed Oct. 1, 1984, Ser. No. 656,607
Claims priority, application Japan, Sep. 30, 1983, 58-180852
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—640 7 Claims

1. A method for separating a liquid mixture comprising separating a liquid mixture across a membrane, said membrane comprising poly(substituted acetylene) having the formula:

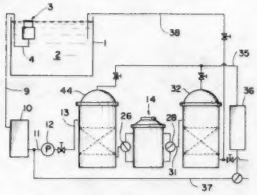


where $R_1$ is a hydrogen atom or a methyl group and $R_2$ is an alkyl group having from one to three carbon atoms, whereby said liquid mixture is separated by pervaporization.

## 4,591,441
## METHOD AND APPAPATUS FOR SEPARATING OIL FROM WATER

Utaro Sakai, Hamamatsu, Japan, assignor to Maruchi Koken Kabushiki Kaisha, Hamamatsu, Japan

Continuation-in-part of Ser. No. 213,011, Dec. 4, 1980, abandoned. This application May 9, 1983, Ser. No. 492,736
Claims priority, application Japan, Dec. 10, 1979, 54-160013
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—649 6 Claims



1. A method of separating oil from water containing emulsified oil particles therein, comprising:

(1) forming an oil resisting oil repelling, water permeable and water-insoluble hydrogel layer on both sides of a lipophilic porous material such that both said oil repelling hydrogel and said lipophilic porous material are exposed in a closely interlaced pattern to produce a coalescence element;

(2) subjecting said coalescene element to water containing emulsified oil particles; and

(3) causing said water to flow in alternate forward and reverse directions through said coalescence element.

## 4,591,442
## FLASH CHROMATOGRAPHY

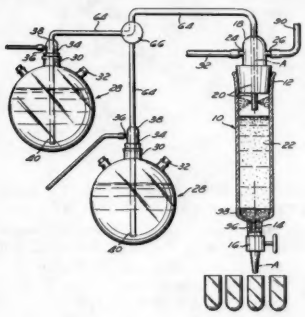
Robert S. Andrews, Dana Point, Calif., assignor to Nelson Research & Development Co., Irvine, Calif.

Filed Nov. 26, 1984, Ser. No. 674,600
Int. Cl.[4] B01D *15/08*
U.S. Cl. 210—656 14 Claims

13. In a method for performing flash chromatography, comprising the steps of:

introducing a sample into a chromatography column;

delivering compressed air-pressurized solvent at a pressure of from about 1 psi to about 20 psi through tubing from a separate solvent reservoir into the top of the column; and purifying the sample by eluting it through the column with the pressurized solvent,



the improvement comprising minimizing solvent contamination by providing a relatively static head of air to pressurize the solvent reservoir.

## 4,591,443
## METHOD FOR DECONTAMINATING A PERMEABLE SUBTERRANEAN FORMATION

Richard A. Brown, Trenton, and Robert D. Norris, Cranbury, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Nov. 8, 1984, Ser. No. 669,409
Int. Cl.[4] C02F *1/72*
U.S. Cl. 210—747 18 Claims

1. A process for chemically oxidizing a contaminant in a permeable subterranean formation containing groundwater comprising introducing an aqueous treating solution into the formation said aqueous treating solution comprising 0.1% to 20% hydrogen peroxide and from 1 to 100 kilograms of a hydratable polymeric material per cubic meter of aqueous treating solution to provide sufficient visc: sity to modify the distribution of the aqueous treating solution within the subterranean formation to provide sufficient hydrogen peroxide proximate to the contaminant to oxidize the contaminant to a less objectionable form yet minimize the distribution of hydrogen peroxide to portions of the subterranean formation free from the contaminant.

## 4,591,444
## PROCESS FOR EXHAUSTIVELY DECONTAMINATING PERFLUOROPOLYETHEREAL OILS

Gerardo Caporiccio, Milan, and Ezio Strepparola, Treviglio, both of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Mar. 13, 1985, Ser. No. 711,361
Claims priority, application Italy, Mar. 15, 1984, 20061 A/84
Int. Cl.[4] C02F *1/32, 1/76*
U.S. Cl. 210—748 3 Claims

1. A process for completely removing from a perfluoropolyether having a minimum vapor tension, organic polluting substances containing group —OH and/or

bonds, which consists of treating the perfluoropolyether in the liquid state, at a temperature ranging from 150° to 200° C., with a gaseous reagent selected from oxygen, chlorine, fluorine, and in the presence of ultraviolet radiations of a wavelength ranging from 240 to 600 nm, thereby converting the polluting substances into volatile degradation products, and removing

the volatile degradation products by degassing the perfluoropolyether.

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**4,591,445**

## METHOD FOR SEPARATING BACTERIA FROM A BACTERIA CONTAINING LIQUID SAMPLE

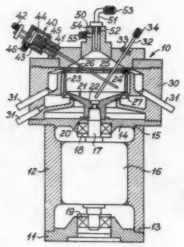
**Max Spinell, Hillerod, and Bertil Engstrom, Graested, both of Denmark, assignors to N. Foss ApS, Hillerod, Denmark**

**Filed Jun. 8, 1984, Ser. No. 618,517**

**Claims priority, application Denmark, Jun. 10, 1983, 2682/83**

**Int. Cl.[4] B01D *21/26***

**U.S. Cl. 210—781** **9 Claims**



**1**. A method of separating bacteria from a bacteria containing liquid sample by means of a dish-like centrifuge container having an upper opening defined by a radially inwardly extending rim portion, comprising the following sequential steps:

(a) rotating the centrifuge container at a high rotational speed,

(b) introducing a volume of a high density component of a density higher than the density of the bacteria into the centrifuge container,

(c) introducing a volume of a low density component of a density lower than the density of the bacteria into the centrifuge container, so as to form a two component gradient separation layer within the centrifuge container,

(d) introducing a continuous flow of the liquid sample of a density lower than the density of the low density component into the centrifuge container, whereby the bacteria are deposited in the interface between the high and the low density components of the two component gradient separation layer, while the liquid sample is discharged through the upper opening of the centrifuge container,

(e) introducing a flushing agent into the centrifuge container, whereby the flushing agent is discharged from the upper opening of the centrifuge container,

(f) decelerating the centrifuge container and rotating it at a low rotational speed,

(g) activating and moving a suction pipette from a first position having its tip remote from the inner surface of the peripheral wall of the centrifuge container to a second position having its tip arranged adjacent to said inner surface, so as to suck liquid substance from the centrifuge container, while introducing a volume of a transfer liquid into the centrifuge container without discharging transfer liquid through the upper opening of the centrifuge container, and

(h) returning the suction pipette to its first position.

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**4,591,446**

## METHOD OF FILTERING AND A DEVICE FOR FILTERING SOLID-CONTAINING LIQUIDS

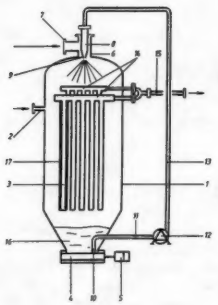
**Hans Müller, Erlenbach, Switzerland, assignor to DrM Dr. Müller AG, Mannedorf, Switzerland**

**Filed Aug. 8, 1984, Ser. No. 638,885**

**Claims priority, application Switzerland, Aug. 8, 1983, 4290/83**

**Int. Cl.[4] B01D *29/12***

**U.S. Cl. 210—797** **10 Claims**



**1**. A method of filtering non-filtered residual suspension of a filtered liquid in a pressure container having an upper portion and a bottom portion, and a plurality of tube-like filter elements vertically suspended in said container and provided with a filter fabric through which a liquid to be filtered is passed and which is subjected to depositing of a filter cake during the filtering process, the method comprising the steps of collecting a residual suspension of the non-filtered liquid in the bottom portion of said container; pumping said suspension out from said container; providing an injector in said upper portion; conveying said pumped-out suspension upwardly immediately into said injector; spraying said suspension by means of said injector over said filter elements; and feeding gas into said container immediately at said upper portion whereby said suspension is forced through said filter elements and is completely filtered out.

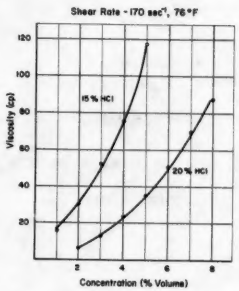
**9**. A pressure filter for filtering liquid containing solids, comprising a pressure container having an upper portion; a plurality of vertically suspended tube-like filter elements disposed in said container and provided with a filter fabric through which a liquid to be filtered is passed and which is subjected to depositing of a filter cake during the filtering process; said container having a bottom portion in which a residual suspension of a non-filtered liquid is collected; pump means positioned outside of said container and connected to said bottom portion for pumping therefrom said suspension; injector means positioned in said upper portion of said container; conduit means disposed outside said container and connected to said pump means for immediately conveying the pumped-out suspension from said pump means upwardly into said injector, said injector means spraying said suspension over said filter elements; and pressure gas feeding means positioned at said upper portion to feed into said container pressure gas which forces said suspension through said filter elements to completely filter out said suspension.

4,591,447

## AQUEOUS GELLING AND/OR FOAMING AGENTS FOR AQUEOUS ACIDS AND METHODS OF USING THE SAME

Gregory Kubala, Broken Arrow, Okla., assignor to Dowell Schlumberger Incorporated, Tulsa, Okla.

Filed Mar. 16, 1984, Ser. No. 590,284
Int. Cl.[4] C09K 3/00
U.S. Cl. 252—8.55 C 7 Claims




1. In a method of acid treating a subterranean formation penetrated by a wellbore by injecting an acid treatment fluid through the wellbore and into contact with the formation, the improvement comprising using as said acid treatment fluid a gelled aqueous substantially unfoamed inorganic acid solution comprising:

(a) an inorganic acid;

(b) water; and

(c) an effective amount of a buffered gelling/foaming agent to gel said inorganic acid and water consisting of:

(i) a N,N-bis(2-hydroxyethyl) fatty amine acetic acid salt;

(ii) an alkali metal acetate salt;

(iii) acetic acid; and

(iv) water.

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4,591,448

## DISHWASHING COMPOSITIONS

Machiel Goedhart, Rozenburg; Franciscus H. Gortemaker, Mijnsheerenland; Hermanus C. Kemper, Brielle, and Hendrik S. Kielman, Maassluis, all of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Oct. 12, 1984, Ser. No. 660,603
Claims priority, application United Kingdom, Oct. 20, 1983, 8328076
Int. Cl.[4] C11D 9/42
U.S. Cl. 252—99 4 Claims

1. A powdered non-enzymatic mechanical dishwashing composition consisting essentially of:

(a) 0.5–10% of an active detergent;

(b) 10–90% of a builder salt;

(c) 1–5% of a chlorine bleaching agent; and

(d) from 0.5–40% of a layered clay selected from the group consisting of the smectites, kaolins, illites chlorites, attapulgites and mixed layer clays;

the composition having a pH of between 9 and 11 at 3 g/l in aqueous solution.

4,591,449

## DISHWASHING COMPOSITION

Machiel Goedhart, Rozenburg; Franciscus H. Gortemaker, Mijnsheerenland; Hermanus C. Kemper, Brielle, and Hendrik S. Kielman, Maassluis, all of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Oct. 12, 1984, Ser. No. 660,605
Claims priority, application United Kingdom, Oct. 20, 1983, 8328078
Int. Cl.[4] C11D 9/42
U.S. Cl. 252—99 4 Claims

1. A powdered non-enzymatic mechanical dishwashing composition consisting essentially of:

(a) 0.5–10% of an active detergent;

(b) 10–90% of a builder salt;

(c) 1–5% of a chlorine bleaching agent; and

(d) from 0.5–40% of a layered clay selected from the group consisting of the smectites, kaolins, illites chlorites, attapulgites and mixed layer clays;

the composition having a pH greater than 11 and no more than 13.5 at 3 g/l in aqueous solution.

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4,591,450

## PROCESS FOR THE PREPARATION OF A BLEACHING ACTIVATOR IN GRANULAR FORM

Ugo Nistri, Genoa; Romano Baroffio, Tradate, and Paolo Colombo, Saronno, all of Italy, assignors to Mira Lanza S.p.A., Genoa, Italy

Filed Dec. 11, 1984, Ser. No. 680,951
Claims priority, application Italy, Mar. 22, 1984, 12470 A/84
Int. Cl.[4] C11D 7/16, 7/54
U.S. Cl. 252—135 11 Claims

1. A process for the production of a bleaching activator in granular form, said process comprising:

a. filtering an aqueous suspension of acetylated bleach activator to recover a filtration cake comprised of said acetylated bleach activator and having a moisture content of from 20 to 65% by weight;

b. mixing and granulating from 1 to 7 parts by weight of said filtration cake of step (a) with 1 part by weight of sodium tripolyphosphate in a granulator means to provide a granulated product; and

c. drying said granulated product to a residual moisture content of from 5 to 15% by weight to obtain said bleaching activator.

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4,591,451

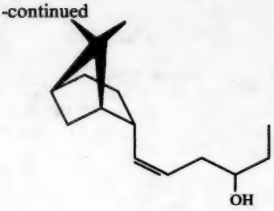
## METHYL SUBSTITUTED PINYL OXOPENTENES AND ORGANOLEPTIC USES THEREOF

Braja D. Mookherjee, Holmdel; Robert W. Trenkle, Bricktown; Robin K. Wolff, Point Pleasant; Richard M. Boden, Ocean, and Takao Yoshida, West Long Branch, all of N.J., assignors to International Flavors & Fragrances, Inc., New York, N.Y.

Division of Ser. No. 496,679, May 20, 1983, Pat. No. 4,533,491, which is a division of Ser. No. 396,485, Jul. 8, 1982, Pat. No. 4,424,378, which is a continuation-in-part of Ser. No. 362,237, Mar. 26, 1982, Pat. No. 4,428,387. This application May 24, 1984, Ser. No. 613,569
Int. Cl.[4] A61K 7/46
U.S. Cl. 252—522 R 2 Claims

1. A process for augmenting or enhancing the aroma of a consumable material selected from the group consisting of perfume compositions and colognes comprising the step of adding to said consumable material an aroma augmenting or enhancing quantity of a mixture of bicyclic oxo compounds having the structures:

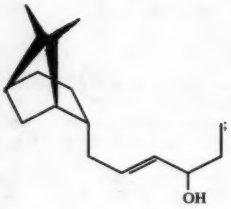
-continued

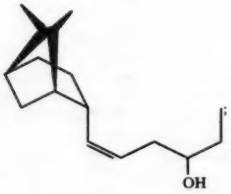


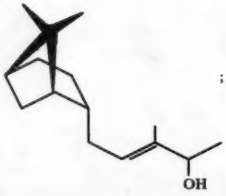
wherein one of $R_1$ or $R_2$ is methyl and the other of $R_1$ or $R_2$ is hydrogen; and wherein one of the dashed lines:

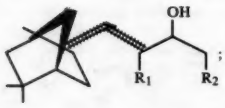
is a carbon-carbon double bond and the other of the lines:

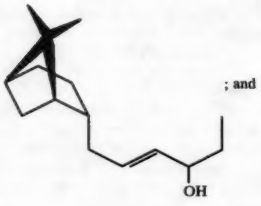
is a carbon-carbon single bond.











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**4,591,452**

## SOLID MULTICOMPONENT MIXTURES OF STABILIZERS AND LUBRICANTS FOR HALOGENATED POLYMERS AND THE PREPARATION THEREOF

**Kurt Worschech; Peter Wedl, both of Loxstedt, and Fridolin Löffelholz, Bermerhaven, all of Fed. Rep. of Germany, assignors to Neynaber Chemie GmbH, Loxstedt, Fed. Rep. of Germany**

**Filed Apr. 1, 1983, Ser. No. 481,846**

**Claims priority, application Fed. Rep. of Germany, Jul. 2, 1982, 3224717**

**Int. Cl.[4] C08K** *5/56, 13/02;* **C09K** *15/06*

**U.S. Cl. 252—400 A** **37 Claims**

1. A process for preparing free-flowing stabilizer and lubricant compositions for halogenated polymers, said compositions comprising:

(a) powdered stabilizer;

(b) powdered lubricant; and

(c) organic lubricant for halogenated polymers that is liquid at room temperature,

at least one of components (a) and (b) being an organic compound and components (a) and (b) being solid at room temperature, wherein a mixture of components (a) and (b) is intensely fluid-mixed together with from about 0.2 to 5 parts by weight, per 100 parts by weight of said mixture, of component (c), the process being carried out so that melting or softening of components (a) and (b) does not occur.

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**4,591,453**

## ELECTROLYTIC SOLUTION FOR A REDOX SYSTEM

**Kenkichiro Kobayashi, Kawasaki, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 462,971, Feb. 1, 1983, abandoned. This application Sep. 6, 1984, Ser. No. 647,792**

**Claims priority, application Japan, Feb. 1, 1982, 57-14585**

**Int. Cl.[4] H01M** *4/88*

**U.S. Cl. 252—182.1** **2 Claims**

1. An electrolytic solution for use in a redox system consisting of: a nonaqueous solvent which is acetonitrile or propylene carbonate; and an electrolyte which is a complex salt including 2,2'-dipyridyl or 1,10-phenanthroline and a metal ion selected from the group consisting of ions of Fe, Ru and Os; wherein the electrolyte is dissolved in the solvent in an amount of at least 0.5 mol % and wherein the electrolytic solution has an electric conductivity of at least $5\times10^{-2}$ $(\Omega cm)^{-1}$ at room temperature.

## 4,591,454
## APPARATUS AND METHOD FOR MELTING AND TREATING METAL WASTES

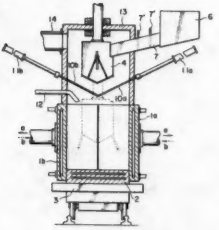
Katsuyuki Ohtsuka, Mito; Ryukichi Mizuno; Koji Yanagida, both of Ibaragi; Kazuo Kitagawa; Atsuhiro Ochiai, both of Kobe; Minoru Harada, Matsudo, and Hiroshi Matsumoto, Kobe, all of Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo, Japan

Continuation of Ser. No. 368,437, Apr. 14, 1982, abandoned. This application Aug. 21, 1984, Ser. No. 642,750

Claims priority, application Japan, Apr. 14, 1981, 56-56548; Oct. 15, 1981, 56-165050

Int. Cl.[4] G21F *9/34, 9/00*

U.S. Cl. 252—626 1 Claim



1. A method of recovering metal from metal waste that has become contaminated by radioactive material by melting and treating the metal waste by an electroslag melting process, using a truck, a water-cooled cylindrical, bottom-opened mold divided in the middle thereof into first and second parts, a slag melt starting agent, slag, a lifting bucket, a plurality of shutters and a liftable nonconsumable electrode disposed above the mold, which comprises:

assembling on the upper surface of said truck said water-cooled, cylindrical mold having an open top and bottom and being divided substantially in the middle into a first and second part, said first and second part being horizontally movable toward and away from each other so as to close or open the mold;

charging said slag melt starting agent and said slag into the mold in layers by using said lifting bucket for charging a material to be treated disposed above said mold;

lifting said lifting bucket to a shunted position and shutting off said bucket and mold from each other by said plurality of shutters,

lowering said liftable non-consumable electrode disposed above the mold, through a hole formed in said plurality of shutters until a front end portion thereof reaches said melt starting agent layer, passing electricity therethrough to ignite the slag melt starting agent to start melting of the slag and continuing passage of electricity to melt the slag,

lifting the non-consumable electrode to its shunted position, opening the plurality of shutters and charging said contaminated metal waste into the mold by using said lifting bucket;

closing the plurality of shutters, blowing inert gas into the mold, lowering the non-consumable electrode until the front end thereof is immersed in the molten slag layer and passing electricity to melt the metal wastes by Joule heat; and

means for trapping at least some of said radioactive material in said slag.

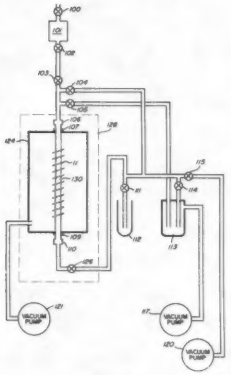
## 4,591,455
## PURIFICATION OF CONTAMINATED LIQUID

Pedro B. Macedo, 6100 Highboro Dr., Bethesda, Md. 20817; Herbert G. Sutter, Gaithersburg, Md.; Robert K. Mohr, Washington, D.C., and Catherine J. Simmons, Bethesda, Md., assignors to Pedro B. Macedo, Bethesda and Theodore A. Litovitz, Annapolis, both of, Md.

Filed Nov. 24, 1982, Ser. No. 444,176

Int. Cl.[4] G21F *9/16*

U.S. Cl. 252—629 12 Claims



1. An ion exchange composition comprising a non-radioactive inorganic ion exchange medium for radioactive ions and an additive therefor, said ion exchange medium being selected from the group consisting of:

(i) porous silicate glass or porous silica gel;

(ii) natural or synthetic clays;

(iii) hydrated metal oxides;

(iv) the alkali salts of said hydrated metal oxides, and

(v) mixtures of (i)–(iv);

said ion exchange medium having a sintering temperature above about 1300° C., said additive being a sintering aid for said ion exchange medium and permitting said composition to be sintered at a temperature below about 120° C., said additive being substantially incapable of ion exchange with said ion exchange medium and having a chemical durability represented by a leach rate of less than about $10^{-4}$ gm/cm$^2$/day.

## 4,591,456
## PROCESS FOR OBTAINING HOMOGENEOUS LAYERS OF NATIVE COLLAGEN, ITS APPLICATION IN COVERING OR ENCAPSULATING VARIOUS SUPPORTS AND THE SUPPORTS THUS COVERED

Alain Huc, Ste Foy-les-Lyon; Rene Gimeno, Pelussin, and Daniel Herbage, Lyons, all of France, assignors to Bioetica, S.A., Lyons, France

Continuation of Ser. No. 596,420, Apr. 3, 1984, abandoned. This application May 29, 1985, Ser. No. 738,910

Int. Cl.[4] C08H *1/06, 1/00;* C08L *89/06;* C09H *7/00*

U.S. Cl. 530—356 4 Claims

1. A process for producing a support coated with a homogeneous layer of native collagen which comprises the steps of:

(a) forming an acid-soluble methanolic solution of native collagen;

(b) applying the methanolic solution to a support to cover the support with a homogeneous layer of native collagen;

(c) air-drying the coating on said support to a homogeneous layer of native collagen; and

(d) subjecting the support coated during step (c) and after air-drying to a thermal treatment under vacuum at 100° C. for 24 hours, to assure reticulation of the collagen.

**4,591,457**

## ARYSULPHONYL AZETIDINE COMPOUNDS USED AS INTERMEDIATES

**Gary Scholes, and Robert van Helden, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

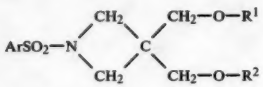
**Division of Ser. No. 569,419, Jan. 9, 1984. This application Jul. 29, 1985, Ser. No. 759,799**

**Claims priority, application United Kingdom, Jan. 13, 1983, 8300860**

**Int. Cl.[4] C07D *491/113, 205/04***

**U.S. Cl. 260—239 A** **1 Claim**

**1.** Compounds of the formula



wherein Ar represents a para-tolyl group, $R^1$ and $R^2$ each separately represents hydrogen, or $R^1$ and $R^2$ together represent the group

wherein each of the indicated free valence bonds is bonded to one of the indicated oxygen atoms.

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**4,591,458**

## 3-AMINO-4-OXO-2,3,4,5-TETRAHYDRO-1,5-BENZOXAZEPINE DERIVATIVES

**Hirosada Sugihara, Osaka; Kohei Nishikawa, Kyoto, and Katsumi Ito, Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

**Division of Ser. No. 637,620, Aug. 4, 1984, Pat. No. 4,548,932. This application Jul. 26, 1985, Ser. No. 759,342**

**Claims priority, application PCT Int'l Appl., Aug, 12, 1983, PCT/JP83/00264; Apr. 27, 1984, PCT/JP84/00221; Jul. 13, 1984, PCT/JP84/00362**

**Int. Cl.[4] C07D *513/04;* A61K *31/55***

**U.S. Cl. 260—239.3 B** **4 Claims**

**1.** 3(S)-[8-Amino-1(S)-ethoxycarbonyloctyl]amino-4-oxo-2,3,4,5-tetrahydro-1,5-benzoxazepine-5-acetic acid or a pharmaceutically acceptable salt thereof.

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**4,591,459**

## INTERMEDIATES FOR 6-(AMINOACYLOXYMETHYL) PENICILLANIC ACID 1,1-DIOXIDES

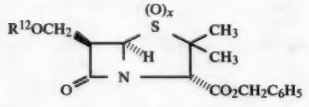
**Wayne E. Barth, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Filed Dec. 3, 1984, Ser. No. 677,663**

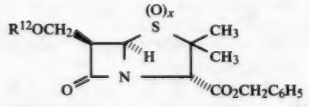
**Int. Cl.[4] C07D *499/00;* A61K *31/425***

**U.S. Cl. 260—245.2 R** **20 Claims**

**1.** A compound having the formula



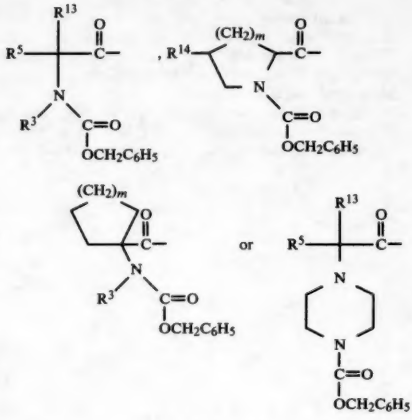
(V)



(VI)

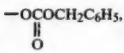
wherein x is 0, 1 or 2; $R^{12}$ is

-continued

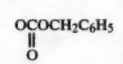


$R^3$ and $R^5$ are each independently hydrogen or ($C_1$–$C_3$) alkyl;

$R^{13}$ is hydrogen, ($C_1$–$C_6$) alkyl, phenyl or benzyl; or one of said ($C_1$–$C_6$) alkyl, phenyl or benzyl monosubstituted with



—$NR^8R^{15}$, —$NHCOR^3$, —$CONH_2$, —$COOCH_2C_6H_5$ or —$COOR^8$; $R^8$ and $R^{15}$ are each independently ($C_1$–$C_3$)alkyl $R^{14}$ is hydrogen, hydroxy,



or —$OCOR^3$; and m is 0, 1 or 2.

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**4,591,460**

## PROCESS FOR THE DECOMPOSITION OF A COMPLEX OF ORTHOBENZOYL-BENZOIC ACID, HYDROGEN FLUORIDE AND BORON TRIFLUORIDE

**Michel Devic, Lyons, France, assignor to Atochem, France**

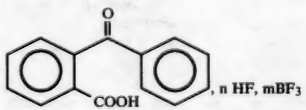
**Filed Mar. 19, 1984, Ser. No. 590,861**

**Claims priority, application France, Mar. 30, 1983, 83 05207**

**Int. Cl.[4] C07C *50/18***

**U.S. Cl. 260—369** **10 Claims**

**1.** Process for the decomposition of complexes of orthobenzoyl-benzoic acid, hydrogen fluoride and boron trifluoride of the general formula:



(I)

in which n and m are between 1 and 6 on the one hand for recovery of the hydrogen fluoride and the boron trifluoride, and, on the other hand, to obtain the anthraquinone resulting from cyclization of the orthobenzoyl-benzoic acid, the improvement comprising subjecting the said complex to the action of sulfuric acid in a concentration of at least about 96% by weight or of an oleum, under a pressure at most equal to atmospheric pressure and at a temperature between 100° C. and 180° C.

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**4,591,461**

## PREPARATION OF TRI-CYCLO NITRILES

**Alain Jouquey, Paris, and Peter F. Hunt, Gonesse, both of France, assignors to Roussel Uclaf, Paris, France**

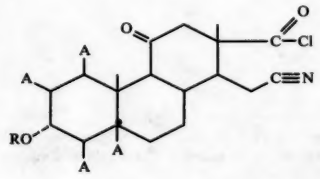
**Division of Ser. No. 612,606, May 21, 1984, Pat. No. 4,565,876. This application Oct. 28, 1985, Ser. No. 791,773**

**Claims priority, application France, Jun. 20, 1983, 83 10141**

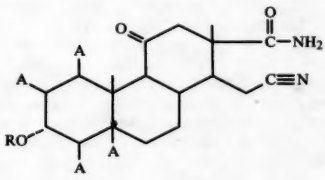
**Int. Cl.[4] C07C *121/46, 121/47***

**U.S. Cl. 558—429** **5 Claims**

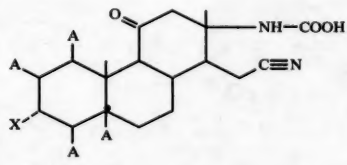
1. A compound having a formula selected from the group consisting of



IV



V



VI

wherein A is selected from the group consisting of hydrogen and tritium, R is acyl of an organic alkansic carboxylic acid of 1 to 8 carbon atoms and X is a halogen.

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**4,591,462**

## FIRE CONTROL SYSTEM FOR A GAS AND LIQUID CONTACT APPARATUS

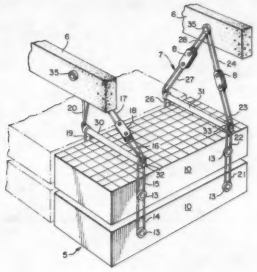
**Charles A. Peterson, Bridgewater, N.J., assignor to Hamon-Sobelco, Brussels, Belgium**

**Filed Jul. 3, 1985, Ser. No. 751,723**

**Int. Cl.[4] B01F *3/04;* A62C *37/30***

**U.S. Cl. 261—108** **6 Claims**

1. An installation for contacting a liquid with a gas comprising an enclosure, a gas inlet at the lower end of the enclosure and an upper gas outlet from the enclosure, a plurality of gas and liquid contact units composed of combustible material disposed in the enclosure above the gas inlet opening, horizontal frame means in the enclosure, cables suspending the gas and liquid contact units from said frame means and fusable links in said suspending cables, said fusable links comprising a pair of



plastic hubs connected by a pair of spaced plastic bridge elements.

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**4,591,463**

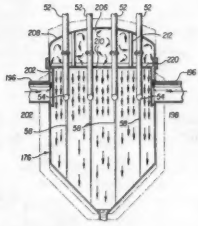
## METHOD AND APPARATUS FOR TREATING LIQUID MATERIALS

**John E. Nahra, Potomac, and Walter Woods, Silver Spring, both of Md., assignors to DASI Industries, Inc., Chevy Chase, Md.**

**Continuation of Ser. No. 506,623, Jun. 22, 1983, abandoned, which is a continuation of Ser. No. 277,606, Jun. 26, 1981, Pat. No. 4,419,301, which is a continuation of Ser. No. 83,362, Oct. 10, 1979, Pat. No. 4,310,476, which is a continuation-in-part of Ser. No. 29,391, Apr. 12, 1979, abandoned, which is a continuation of Ser. No. 806,849, Jun. 15, 1977, abandoned. This application Oct. 24, 1984, Ser. No. 664,101**

**Int. Cl.[4] B01F *3/04***

**U.S. Cl. 261—116** **14 Claims**



1. A process for heating a liquid product in a pressure vessel to a predetermined treatment temperature where said product can have an important properly adversely affected by being excessively heated or excessively physically stressed, the improvement comprising the steps of:

supplying said product to an apertured means of a film forming head positioned within said vessel at a uniform velocity throughout the length of the film forming head;

discharging said product at a predetermined flow rate from said aperture means directly into said vessel without contacting any surface other that said aperture means to form a substantially uniform thin continuous, free falling film of said liquid product within said pressure vessel;

directly heating said body of product as a continuous falling film to bring it to said predetermined treatment temperature in a predetermined time period by providing low velocity substantially saturated steam at a constant above atmospheric pressure to said pressure vessel in such a way as to maintain said film as a continuous, isolated film of liquid product;

causing said liquid body of product to pass directly from said

aperture means to fall freely through said saturated steam as a film without engaging any surface within said pressure vessel that is higher in temperature than said liquid product;

providing a sufficient height of fall of said thin film in said low velocity saturated steam to maintain said film as a continuous isolated liquid free falling film during said time period that it is raised to said treatment temperature;

cooling the interior surface of said vessel so as to provide a temperature that will not heat the fallen liquid;

accumulating said liquid product of said falling film in said pressure vessel in contact with the cooled interior surface of said vessel, while maintaining said product in a liquid form in a continuous uninterrupted flow from falling as said continuous falling film to accumulating in said liquid form due to said predetermined discharge flow rate from said aperture means; and

withdrawing said fallen liquid product from said vessel without subjecting it to splashing or other violent physical agitation.

**12**. An apparatus for heating a liquid product in a pressure vessel to a predetermined treatment temperature where said product can have an important property adversely affected by being excessively heated or excessively physically stressed, the improvement comprising:

means for supplying said product to an aperture means of a film forming head positioned within said vessel at a uniform velocity throughout the length of said film forming head;

said aperture means arranged for discharging said product at a predetermined flow rate from said aperture means directly into said vessel without contacting any surface other than said aperture means to form a continuous substantially uniform thin isolated free falling film of said liquid product within said pressure vessel;

means for directly heating said body of product to bring it to said predetermined treatment temperature in a predetermined time period by providing low velocity substantially saturated steam at a constant above atmospheric pressure to said pressure vessel in such a way as to maintain said film as a continuous, isolated free falling film of liquid product;

said aperture means arranged in said vessel to cause said body of liquid product to pass directly from said aperture means to fall freely through said saturated steam without engaging any surface within said pressure vessel that is higher in temperature than said liquid product;

said aperture means located in said vessel to provide a sufficient height of fall of said thin film in said low velocity steam to maintain said falling film as a continuous isolated liquid film during said time period that it falls and is raised to said treatment temperature of the liquid;

means for cooling the interior surface of said vessel so as to provide a temperature that will not heat the fallen product;

said vessel arranged to accumulate said fallen product of said film in said pressure vessel in contact with the cooled interior surface of said vessel, while maintaining said product in liquid form in a continuous uninterrupted flow from falling as said continuous falling film to accumulating in said liquid form due to said predetermined discharge flow rate from said aperture means; and

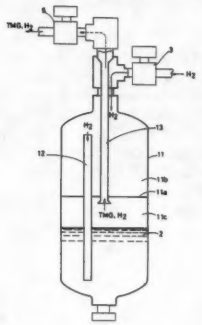
means for withdrawing said product from said vessel without subjecting it to splashing or other violent physical agitation.

**4,591,464**

## METHOD AND APPARATUS FOR EVAPORATING A LIQUID ORGANIC METAL

**Nobuaki Kaneno, and Kazuhisa Takahashi, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 15, 1984, Ser. No. 671,987**
**Claims priority, application Japan, Nov. 22, 1983, 58-221101**
**Int. Cl.[4] B01F** *3/04*
**U.S. Cl. 261—153** **5 Claims**




**1**. A bubbling evaporator for evaporating a liquid organic metal to be used in a vapor deposition process for manufacturing semiconductor devices and the like, said evaporator comprising:

a vessel (**11**) in a constant temperature bath,

a partition plate (**11***a*) for dividing said vessel (**11**) into an upper chamber (**11***b*) for temporarily storing carrier gas and a lower chamber (**11***c*) for containing liquid (**2**),

means for admitting carrier gas into the upper chamber,

an inlet pipe (**12** or **14**) for allowing said carrier gas to blow from said upper chamber (**11***b*) into said liquid (**2**) in said lower chamber (**11***c*) through said partition plate (**11***a*) to bubble and evaporate said liquid (**2**), wherein said inlet pipe (**12**) has an upper end located above said partition plate and within the upper chamber, said upper end terminating within an upper region of the upper chamber, and

an outlet pipe (**13**) for leading the evaporated vapor together with said carrier gas to the exterior of said vessel (**11**).

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**4,591,465**

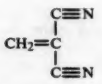
## METHOD OF PRODUCING POLYMERIC ELECTRET ELEMENT

**Seizo Miyata, 3-18-26, Shimohoya, Hoya-shi, Tokyo, Japan; Shigeru Tasaka, Tokyo; Kazuo Saito, Ibaraki; Iwao Seo, Ibaraki; Kenji Nakajima, Ibaraki, and Takeshi Kosaka, Ibaraki, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd. and Seizo Miyata, both of Tokyo, Japan**

**Filed Sep. 18, 1984, Ser. No. 651,778**
**Claims priority, application Japan, Sep. 28, 1983, 58-179961**
**Int. Cl.[4] B29C** *71/02, 71/04*
**U.S. Cl. 264—22** **17 Claims**

**1**. A method of producing a polymeric electret element, which comprises;

heat-treating a molded article of a copolymer comprising vinylidene cyanide represented by the formula:



and a comonomer selected from the group consisting of

vinyl compounds, other vinylidene compounds and dienes at a temperature not higher than the glass transition temperature thereof for a time represented by equation (I) before or simultanesouly with poling:

$$\frac{t_1}{(T_g^0 - T_1) + 80} + \frac{t_2}{(T_g^1 - T_2) + 80} > A \quad (I)$$

where

$t_1$=heat-treatment time (hr),

$t_2$=polarization treatment time (hr),

$T_g^0$=glass transition temperature of copolymer prior to heat-treatment,

$T_g^1$=glass transition temperature of copolymer prior to polarization treatment and is defined by the relationship: $T_g^0 - 80 \leqq T_1 \leqq T_g^0$,

$T_1$=heat-treatment temperature and is defined by the relationship; $T_g^1 - 100 \leqq T_2 \leqq T_g^1$, $T_2$=polarization treatment temperature, and

$A = 1/80$

provided that both $t_1$ and $t_2$ are negative.

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**4,591,466**

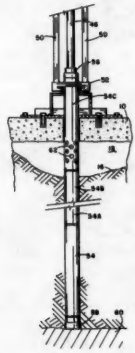
## METHOD FOR POSITIONING AND STABILIZING A CONCRETE SLAB

**Clarence L. Murray, and John T. Bright, both of Tulsa, Okla., assignors to Foundation Control Systems, Tulsa, Okla.**

**Division of Ser. No. 543,624, Oct. 20, 1983, Pat. No. 4,507,069. This application Dec. 12, 1984, Ser. No. 680,774**

**Int. Cl.[4] E04B** *1/16*

**U.S. Cl. 264—35** **7 Claims**



1. A method of restoring and stabilizing a sunken concrete slab to its desired position on the earth's surface comprising the steps of:

boring a vertical opening through the slab;

attaching a plate structure to the slab upper surface, the plate structure having an opening therethrough in alignment with the opening in the slab;

driving a vertical support column vertically through said openings in the plate structure and the slab and into supporting engagement with the earth;

applying lifting force between the driven support column and the plate structure to lift the slab to its desired position; and

inserting fill material between the lifted slab and the earth's surface to stabilize the slab in its lifted position.

**4,591,467**

## METHOD FOR REMOVING MOISTURE AND VOLATILES FROM MOLDING PARTICULATE PLASTIC MATERIAL FEED

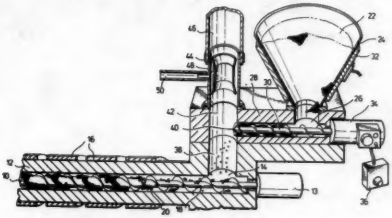
**Jaroslav J. Kopernicky, Bramalea, Canada, assignor to Mapro Inc., Georgetown, Canada**

**Continuation-in-part of Ser. No. 517,580, Jul. 27, 1983, abandoned. This application Feb. 10, 1984, Ser. No. 578,879**

**Claims priority, application Canada, Jul. 22, 1983, 433017**

**Int. Cl.[4] B29B** *7/42, 7/82, 7/84*

**U.S. Cl. 264—37** **8 Claims**



1. A process for feeding particulate plastic material and removing volatiles through a common opening in a heated barrel in which a plasticizing screw rotates to feed plastic material for molding, comprising:

feeding particulate plastic material to said opening in the barrel at a rate controlled to only partially fill the barrel adjacent the inlet opening, and

applying sufficient suction in communication with said opening to remove hot volatiles which are released and escape through said opening in the barrel as the particulate plastic material is gradually melted by the heat and shearing forces as it is compressed by the screw as it is carried along the barrel away from said opening,

whereby the interruption of flow of the particulate material into said barrel opening by bridging of the particulate material across said barrel opening is avoided.

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**4,591,468**

## PROCESS FOR REMELTING POLYAMIDES

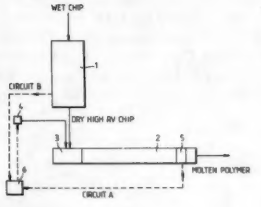
**Gordon W. Follows; Christopher G. Hart, and John Massey, all of Harrogate, England, assignors to Imperial Chemical Industries PLC, Great Britain**

**Filed Mar. 22, 1983, Ser. No. 477,684**

**Claims priority, application United Kingdom, Mar. 28, 1982, 8212238**

**Int. Cl.[4] B29B** *13/02;* **B29C** *47/78, 47/92*

**U.S. Cl. 264—40.1** **18 Claims**




1. A process for remelting polyamide polymer to produce a molten polymer of set melt viscosity without prolonged preconditioning comprising adding a controlled amount of liquid water to the solid polymer, during or immediately prior to remelting within a time less than that normally required to reach equilibrium conditions, the controlled amount of water

being such as to produce in said molten polymer said set melt viscosity.

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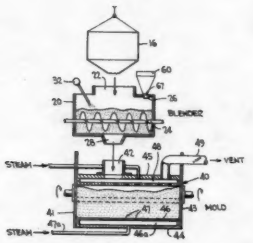
**4,591,469**

## PROCESS FOR MAKING FOAM-IN-FORM POLYURETHANE FOAM BUNS AND APPARATUS THEREFOR

**Michael S. Buchanan, Baltimore, and Gregory B. Davis, Monkton, both of Md., assignors to Wm. T. Burnett & Co., Inc., Baltimore, Md.**

**Filed Jan. 30, 1985, Ser. No. 696,523**
**Int. Cl.[4] B29C *67/20***
**U.S. Cl. 264—45.3** **15 Claims**




**1**. An improved method of forming a foam-filled polyurethane foam bun comprising the steps of

(1) rotating particles of flexible polyurethane foam;

(2) dispensing onto said rotating foam particles a finely divided solid material so as to provide a uniform mixture of said foam particles and said finely divided solid material;

(3) uniformly applying a liquid, flexible polyurethane foam-forming material containing a reactive polyol and a polyisocyanate to said mixture of foam particles and solid material to provide a blend of foam particles and solid material in contact with said foam-forming material; and

(4) distributing said blend into a mold and foaming and curing said foam-forming material by a sequence of steaming steps as follows:

(a) steaming from a first position of said mold;

(b) discontinuing steaming;

(c) flipping said mold;

(d) steaming from a second position;

(e) discontinuing said steaming, and

(f) repeating the flipping of said mold and steaming at least once to effect a final foaming and curing.

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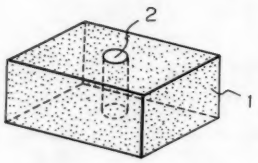
**4,591,470**

## PROCESS FOR PREPARING STRUCTURAL BODIES OF GRANULAR MATERIAL

**Fumio Goto, and Taro Ogawa, both of Kurashiki, Japan, assignors to Namba Press Works Co., Ltd., Kurashiki, Japan**

**Filed Oct. 4, 1983, Ser. No. 538,918**
**Claims priority, application Japan, Oct. 4, 1982, 57-173235**
**Int. Cl.[4] C04B *33/32***
**U.S. Cl. 264—59** **12 Claims**




**1**. A process for molding a structural body of granular material having hollow portions of complicated configurations, comprising:

(a) making a removable insert member of the contours corresponding to said hollow portions from materials capable of being fused at temperatures at which no undesirable influences occur to an unbaked structural body,

(b) placing said insert member in a mold and molding the structural body of granular material integrally with said removable insert member,

(c) fusing the material of said insert member at least in the area surrounding the longitudinal axis thereof to form a through hole extending axially from end to end of said member,

(d) blowing air into said through hole substantially at temperatures for a preliminary baking of said unbaked structural body and for removing substantially all of said insert member without affecting said structural body, and

(e) subjecting said structural body to a final baking at much higher temperatures.

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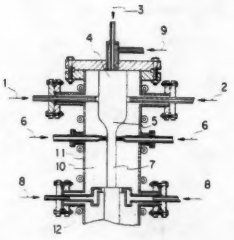
**4,591,471**

## PROCESS AND AN APPARATUS FOR PRODUCING A SINTERABLE POWDERY MATERIAL OF MINUTE COMPOSITE CERAMIC PARTICLES HAVING A DUAL STRUCTURE

**Saburo Hori, Iwaki, Japan, assignor to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 477,765, Mar. 22, 1983, Pat. No. 4,491,482. This application Oct. 24, 1984, Ser. No. 664,517**
**Claims priority, application Japan, Mar. 29, 1982, 57-50541**
**Int. Cl.[4] C04B *35/71***
**U.S. Cl. 264—60** **2 Claims**




**1**. A process for producing a sinterable powdery material of minute composite ceramic particles, having a mean diameter of 400 to 1000 Å and a dual structure comprising a core formed of zirconium oxide and the outer shell formed of aluminum oxide, said process comprising the steps of:

introducing gaseous zirconium tetrachloride into a combustion chamber provided with a constricting section at the center part thereof and a burner at the upper part thereof, the temperature of the upper part of said combustion chamber being 1200° to 1900° C.

introducing gaseous aluminum chloride into said combustion chamber at the constricting section or the lower part thereof, the temperature of the constricting section and the lower part of said combustion chamber being 800° to 1200° C.,

thermally decomposing both the thus introduced zirconium chloride and aluminum chloride by a flame under an oxidative atmosphere.

**2**. An apparatus for producing a sinterable powdery material of minute composite ceramic particles produced by the process according to claim **1**, which comprises a heat resistant combustion chamber as a reaction chamber provided with an outside lining made of a refractory material, a constricting section at the center part thereof, a burner at the part over said constricting section, an inlet at the part over said constricting section for introducing gaseous zirconium chloride forming the core

of said sinterable powdery material of minute composite ceramic particles and an inlet at said constricting section or the section under said constricting section for introducing a gaseous aluminum chloride forming the outer shell of said sinterable powdery of minute composite ceramic particles.

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**4,591,472**

## PROCESS FOR THE PREPARATION OF BLANKS

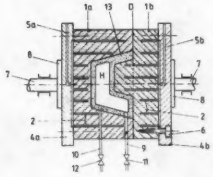
**Thomas Gerster, Laufen, Switzerland, assignor to Keramik Holding AG Laufen, Laufen, Switzerland**

**Filed Mar. 8, 1983, Ser. No. 473,206**

**Claims priority, application Switzerland, Mar. 17, 1982, 1672/82**

**Int. Cl.⁴ B28B *1/26***

**U.S. Cl. 264—87** **10 Claims**




1. A method for the production of blanks by processing slip, consisting of an inorganic and/or organic material having a liquid fraction of between 3 and 90% by weight, by means of core casting and/or hollow casting, comprising the steps of

(a) introducing slip into a mould cavity of a mould, the mould including at least two mould portions formed of porous plastic material and having a plurality of blind holes distributed in a pattern over each mould portion, being adjoined at the side opposite to the mould cavity by a system of channels connected to the open ends of the blind holes, introducing of slip via an inlet channel into the mould cavity under an initial pressure of between 0.1 and 3 bar, and by simultaneously displacing air and residual liquid if present, from the mould cavity into the porous material of the mould portions

(b) applying increased pressure of between 10 to 50 bar onto the slip contained in the mould cavity by simultaneously displacing liquid from the slip into the porous material of the mould portions and into blind holes as well as the system of channels, respectively, and

(c) maintaining that increased pressure until the slip is solidificated at least up to a certain degree.

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**4,591,473**

## METHOD OF SPINNING A NYLON YARN HAVING IMPROVED RETENTION OF A SOIL REPELLENT FINISH ON THE NYLON YARN

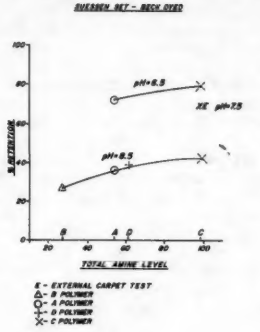
**Robert A. Lofquist; Gene C. Weedon, both of Richmond, and Charles J. Cole, Chester, all of Va., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

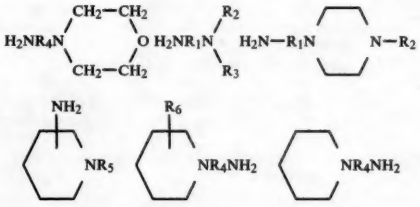
**Continuation of Ser. No. 440,881, Nov. 12, 1982, abandoned. This application Mar. 20, 1984, Ser. No. 591,244**

**Int. Cl.⁴ B29C *59/00*; C08J *9/36*; C08G *69/04*; D01F *6/90***

**U.S. Cl. 264—129** **5 Claims**

1. A method to improve retention of a soil repellent finish on nylon yarn, said finish containing the reaction product of the group consisting of propylene oxide, epibromohydrin and epichlorohydrin with the reaction product of pyromellitic dianhydride with a long chain fluoroalcohol, comprising continuously polymerizing precursors of said nylon in contact with between about 0.03 and 1 mol percent of a primary-tertiary diamine or a primary-ditertiary triamine of the structure




where

$R_1$ is an alpha, omega alkylene or group of 2 to 10 carbon atoms or a cyclo aliphatic,

$R_2$ and $R_3$ are alkyl radicals of 1 to 4 carbon atoms,

$R_4$ is an alkylene group of 1 to 10 carbon atoms,

$R_5$ is $R_4$ or aralkyl, and

$R_6$ is H or alkyl of 1 to 4 carbons so that said nylon is melt stable, continuously spinning said nylon into a yarn and coating said yarn with said finish, thereby improving retention of said finish on said yarn on exposure to heated water.

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**4,591,474**

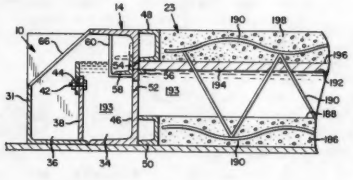
## METHOD FOR CASTING CONCRETE MEMBERS

**Harold H. Scott, Martinez, Calif., and Ralph K. Scott, Kennewick, Wash., assignors to Columbia Fabricators, Kennewick, Wash.**

**Continuation of Ser. No. 354,066, Mar. 2, 1982, abandoned. This application Mar. 28, 1984, Ser. No. 594,477**

**Int. Cl.⁴ B28B *1/16***

**U.S. Cl. 264—253** **10 Claims**




1. A method of forming a multiple layer concrete panel member in which the layers are spaced, comprising:

erecting and joining together a plurality of upstanding sidewall members on a relatively flat surface to define a peripheral form enclosure for defining the lateral limits and

shape of the concrete layers to be formed, with said enclosure being upon at the top and bottom,

sealing the joints between the plural sidewall members to enable lateral containment of water within said enclosure,

pouring a first layer of wet concrete within said enclosure to a first predetermined level substantially below the top of said enclosure and to the lateral limits of said enclosure to close and seal the bottom of the enclosure and thereby form with said sidewall members a liquid-tight tank for containment of water within said enclosure above said layer,

embedding structural means within the wet concrete of the first layer, with said structural means projecting upwardly from the first layer for joinder with a second layer to be formed,

while the concrete of the first layer is still wet, introducing water into the enclosure to fill the enclosure with said water from the top of the first concrete layer to a level below the top of the enclosure and containing such water within the confines of the enclosure and above the first layer,

introducing into and containing within the enclosure a fusible wax material in molten form, the fusible wax material having a melting point above the temperature of the water and a density less than that of the water, to establish a layer of said fusible wax material on the surface of said water and coextensive therewith within the enclosure, with the upper level of the fusible wax material at a predetermined level below the top of the enclosure and below the upper limits of the structural means,

after the fusible wax material has solidified on the surface of said water, pouring a second layer of concrete into the enclosure to the lateral limits thereof and onto the surface of the fusible wax material to embed the upper portions of the structural means within the second layer,

after the second layer of concrete is at least partially cured, melting the layer of fusible wax material,

draining the molten fusible wax material and water from the enclosure through drainage opening means in at least one of the sidewall members,

establishing a weir within a chamber of a first sidewall member and liquid drainage opening means in the same sidewall member below the top of the weir, and introducing the water into the enclosure to fill the enclosure to a water level above the level of the discharge opening and below the level of the top of the weir, introducing the molten fusible wax material into the enclosure, and continuing the introduction of either the molten fusible wax material or the water until the water overflows the top of the weir to establish said predetermined level of the fusible wax material.

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**4,591,475**

## METHOD FOR MOLDING CAPSULES

**Ivan Tomka, Bourguillon, and Fritz Wittwer, Lupisingen, both of Switzerland, assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Division of Ser. No. 362,430, Mar. 26, 1982, abandoned. This application Apr. 29, 1983, Ser. No. 490,057**

**Int. Cl.[4] B29C *45/28, 45/54, 45/73, 45/73***

**U.S. Cl. 264—328.14** **16 Claims**

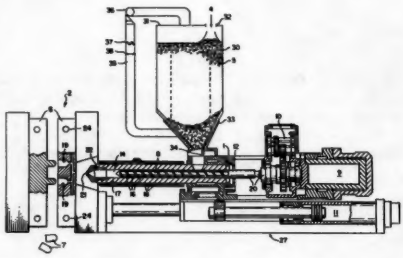
1. The method of manufacturing a shaped product from a hydrophilic polymer and water mixture having no phase separation of the water from the hydrophilic polymer-water mixture at a water content of between about 5 and 25% by weight of the hydrophilic polymer and having a certain glass transition temperature range, comprising the steps of:

(a) mixing the polymer with water in a predetermined amount between about 5 and 25% by weight of the hydrophilic polymer;

(b) heating the hydrophilic polymer with said water while maintaining said predetermined water content to form a melt;

(c) further heating the hydrophilic polymer melt and water to a temperature to dissolve the melt in the water and achieve a homogeneous dispersion on a molecular level while maintaining said predetermined water content;

(d) injecting the dissolved hydrophilic polymer melt into a mold cavity while maintaining said predetermined water content;



(e) cooling the hydrophilic polymer melt in said mold to form a molded product at a temperature below the glass transition temperature range of the hydrophilic polymer while maintaining said predetermined water content; and

(f) ejecting the molded product of said hydrophilic polymer from said mold.

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**4,591,476**

## INJECTION MOULDING CASTING METHOD

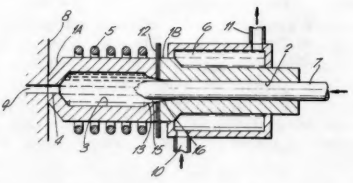
**David Greenwood, Ilmington, and Roger J. Smith, Studley, both of England, assignors to Dynacast International Limited, England**

**Filed Dec. 28, 1984, Ser. No. 687,252**

**Claims priority, application United Kingdom, Dec. 30, 1983, 8334653**

**Int. Cl.[4] B29C *45/18***

**U.S. Cl. 264—328.14** **4 Claims**

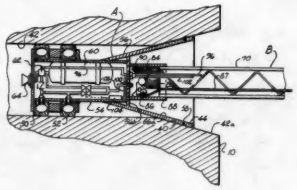


1. A method of injection moulding or casting including the step of discharging moulding or casting material in a moulten or plasticized state under pressure from a discharge opening in a closed heating chamber comprising forcing a solid bar of the material to be moulded or cast as a plunger into the closed heating chamber while said chamber is maintained at a temperature above the melting or plasticizing temperature of the moulding or casting material so that the leading end of the bar melts or plasticizes therein, the unmelted portion of the entering bar displacing molten or plasticized material melted off the leading end out from the chamber through the discharge opening and permitting molten or plasticized material to leak back from the heating chamber along the bar to a point on the bar within the passage and freezing the leaked material surrounding the bar at said point whereby to form a sealing ring around the solid bar.

## 4,591,477
## APPARATUS AND METHOD FOR SERVICING A NUCLEAR REACTOR SYSTEM

Robert A. Rettew, 217 Kingsway Camelot, Clemson, S.C. 29631

Filed Sep. 30, 1982, Ser. No. 432,002
Int. Cl.[4] G21C *19/04;* F16L *55/12*
U.S. Cl. 376—204 17 Claims



1. Apparatus for servicing a pressurized water nuclear power system during a fuel outage wherein the system is the type which includes a reactor vessel disposed in a containment annulus beneath a refueling canal, a hot leg piping system connecting said vessel to an inlet of an associated steam generator unit through which heated water flows, a cold leg piping system connecting a lower portion of said steam generator unit to said nuclear reactor vessel for returning cooled water to said vessel, a pumping unit connected in said cold leg piping system for pumping said water to said nuclear reactor vessel, and a cold leg entrance nozzle in said reactor vessel connected to said cold leg piping system, said apparatus comprising:

a plug unit for sealing the entrance nozzle of said cold leg piping system;

said plug including sealing means for sealing said entrance nozzle and cold leg piping system;

an installation assembly for inserting said plug unit in said cold leg entrance nozzle;

said installation assembly including reciprocating insertion means for inserting said plug unit into said entrance nozzle of said cold leg piping system and removing said plug unit therefrom following servicing of said nuclear reactor system;

connecting means carried adjacent an end of said reciprocating insertion means for releasably connecting said insertion means and said plug unit so that plug unit may be left detached in said cold leg piping system after insertion; and

means carried above said reactor vessel for raising and lowering said installation assembly in and out of said reactor vessel.

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## 4,591,478
## METHOD OF IDENTIFYING DEFECTIVE PARTICLE COATINGS

Mark E. Cohen, and Carlton D. Whiting, both of San Diego, Calif., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Aug. 26, 1983, Ser. No. 526,968
Int. Cl.[4] G21C *17/00*
U.S. Cl. 376—253 9 Claims

1. A method for identifying coated nuclear fuel particles having defective retentive coatings in a group of such particles, said method comprising the following steps:

contacting the particles with a liquid organic iodide capable of wetting the exterior layer surface of said coated particles, said liquid iodide being a compound which includes an element having an atomic number higher than the highest atomic number of any element in the composition which forms said exterior surface of. said particle coating;

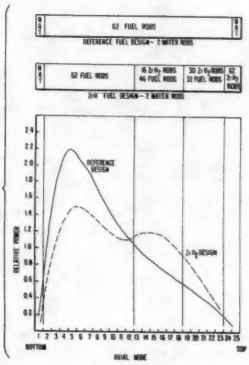
drying the particles; and

radiographing said dried particles.

## 4,591,479
## BOILING WATER REACTOR FUEL BUNDLE

Abraham Weitzberg, Potomac, Md., assignor to NUS Corporation, Gaithersburg, Md.

Continuation of Ser. No. 270,207, Jun. 3, 1981, abandoned. This application Feb. 29, 1984, Ser. No. 583,789
Int. Cl.[4] G21C *3/32*
U.S. Cl. 376—349 23 Claims




1. A method of compensating, without the use of control rods or burnable poisons for power shaping, for reduced moderation of neutrons in an uppermost section of the active core of a boiling water nuclear reactor containing a plurality of elongated fuel rods vertically oriented therein, said fuel rods having nuclear fuel therein, said fuel rods being cooled by water pressurized such that boiling thereof occurs, comprising the steps of:

replacing all of said nuclear fuel in a portion of only the upper half of first predetermined ones of said fuel rods with a solid moderator material of zirconium hydride so that said fuel and said moderator material are axially distributed in said predetermined ones of said fuel rods in an asymmetrical manner relative to a plane through the axial midpoint of each rod and perpendicular to the axis of the rod, said predetermined ones of said fuel rods having less fuel in said upper half thereof than is contained in an upper half of other ones of said fuel rods, said moderator material in said upper half of said predetermined ones of said fuel rods, when inserted in said reactor, enhancing moderation of neutrons in said upper half of the active core of said reactor to compensate for reduced moderation provided by water voids created in said water which boils as said water cools said fuel rods;

placing said moderator material in said first predetermined ones of said fuel rods in respective sealed internal cladding tubes, which are separate from respective external cladding tubes of said first predetermined ones of said fuel rods, to prevent interaction between said moderator material and the external cladding tube of each of said first predetermined ones of said fuel rods; and

wherein the number of said first predetermined ones of said fuel rods is at least thirty, and further comprising the steps of:

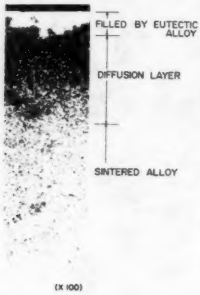
replacing with said moderator material all of the fuel in the upper quarter of each of said at least thirty rods; and

also replacing with said moderator material all of the fuel in the adjacent lower quarter of at least sixteen of said at least thirty rods.

## 4,591,480
## METHOD FOR SEALING POROUS METALS

Tsuyoshi Morishita; Sigemi Osaki; Noriyuki Sakai, all of Hiroshima, and Yasuhumi Kawado, Iwakuni, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Feb. 19, 1985, Ser. No. 702,571
Claims priority, application Japan, Feb. 24, 1984, 59-33750
Int. Cl.[4] B22F *7/00*
U.S. Cl. 419—9 7 Claims

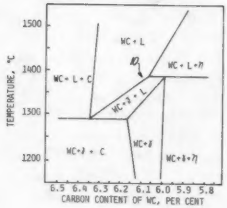



1. A method for sealing porous metals comprised of an iron-based sintered alloy, said method comprising applying powder of a eutectic alloy of one of Fe-P, Fe-P-C, Fe-Mo-C and Fe-B-C type, to the surface of said porous metal member and heating said surface applied with the powder to a temperature higher than the eutectic temperature of said eutectic alloy to allow said molten eutectic alloy to intrude into pores from the surface of the porous metal member so that the melting point of said molten alloy in the pores is promptly increased by diffusion of said element in said porous metal member to solidify said molten metal in the pores, sealing only pores present in the vicinity of the surface of the porous metal member.

## 4,591,481
## METALLURGICAL PROCESS

Roy C. Lueth, Mt. Clemens, Mich., assignor to Ultra-Temp Corporation, Mt. Clemens, Mich.

Continuation-in-part of Ser. No. 535,278, Sep. 23, 1983, which is a continuation-in-part of Ser. No. 375,681, May 6, 1982, Pat. No. 4,431,605. This application Jan. 14, 1985, Ser. No. 690,935
The portion of the term of this patent subsequent to Feb. 14, 2001, has been disclaimed.
Int. Cl.[4] B22F *3/00*
U.S. Cl. 419—26 6 Claims




1. A method for densifying previously liquid phase sintered parts which may contain voids or porosity and constructed of cemented carbides, powdered metals, ceramics or the like comprising the steps of:

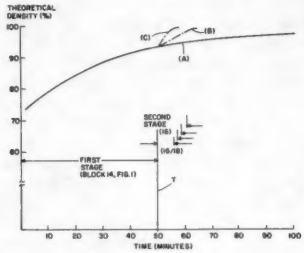
heating said parts in a vacuum to a temperature such that they are substantially in the two phase field of hard phase plus liquid and that an equilibrium or nearly equilibrium amount of hard phase has dissolved in the liquid phase, and

applying a pressure in an amount below that which overcomes the capillary forces imposed on the molten binder in a direction away from the part voids and above the pressure necessary to physically collapse the part structure inwardly to said parts for a predetermined period of time while maintaining said parts above said temperature.

## 4,591,482
## PRESSURE ASSISTED SINTER PROCESS

Andrew C. Nyce, Cape Elizabeth, Me., assignor to Gorham International, Inc., South Windham, Me.

Filed Aug. 29, 1985, Ser. No. 771,199
Int. Cl.[4] B22F *1/00*
U.S. Cl. 419—38 16 Claims




1. Method of formation of metal parts comprising the steps of:

(a) forming an alloy metal powder compact;

(b) heating the compact to a condition of sinter bonding; and

(c) extending the sintering of the compact to achieve a density over 98% theoretical density at a temperature within minus 5–10% to plus 3–5% of the temperature of (b) under an applied pressure in the range 1,000 to 3,000 psi over a period of 5–20 minutes.

## 4,591,483
## NOBLE METAL ALLOYS FOR DENTAL USES

M. H. A Nawaz, Neulingen, Pakistan, assignor to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Feb. 22, 1985, Ser. No. 704,462
Claims priority, application Fed. Rep. of Germany, Feb. 24, 1984, 3406712
Int. Cl.[4] C22C *5/02, 5/04, 30/00*
U.S. Cl. 420—463 5 Claims

1. A noble metal alloy suitable for dental purposes consisting of 20 to 65% gold, 25 to 65% palladium, 0 to 7% gallium, 0.2 to 11% of at least one of the elements indium and tin, 0 to 2% copper, 0.05 to 1% of at least one of the elements ruthenium, iridium and rhenium, 0 to 1% vanadium, 0 to 1% iron and 0.5 to 15% cobalt, with the proviso that the content of base metals is over 5%.

## 4,591,484
## LEAD MATERIALS FOR SEMICONDUCTOR DEVICES

Motohisa Miyafuji; Takashi Matsui, and Hidekazu Harada, all of Shimonoseki, Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Apr. 3, 1985, Ser. No. 719,453
Claims priority, application Japan, Apr. 7, 1984, 59-69496
Int. Cl.[4] C22C *9/06*
U.S. Cl. 420—481 2 Claims

1. A lead material for semiconductor devices comprising from 0.4 to 4.0 wt% of Ni, from 0.1 to 1.0 wt% of Si, from 0.05 to 1.0 wt% of Zn, from 0.01 to 1.0 wt% of Mn, from 0.001 to

less than 0.01 wt% of Mg, from 0.001 to less than 0.01 wt% of Cr, up to 0.003 wt% of S, up to 5 ppm of hydrogen, up to 5 ppm of oxygen, and the balance Cu and inevitable impurities.

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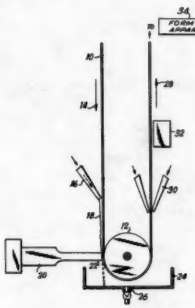
## 4,591,485
## METHOD AND APPARATUS FOR SONICATING ARTICLES

**William L. Olsen, Warwick, N.Y.; John O. Freeborn, New Fairfield, Conn.; Linnea J. Shaver, Sloatsburg, and Janice J. Kelemen, Central Valley, both of N.Y., assignors to International Paper Company, New York, N.Y.**

**Filed Dec. 22, 1983, Ser. No. 564,424**
**Int. Cl.[4] A61L** *2/02*
**U.S. Cl. 422—20** **19 Claims**




1. A method for sonicating articles to remove particles therefrom comprising the steps of (1) directing a moving film of a liquid medium over and in contact with a surface of an article having particles thereon, (2) placing an activated sonic horn in sonic energy transfer relationship to the liquid medium while it is still in the form of a film, so that sound waves produced by the activated sonic horn dislodge particles from the article into the liquid medium film while still on the surface of the article, the liquid medium film, which carries the dislodged particles, being withdrawn from contact with the article so that there is no contact of the liquid medium film on the article with a reservoir of the liquid medium, whereby the particles which have been dislodged from the article are not redistributed over the article by continued contact with the reservoir of liquid medium.

2. A method for sonicating a moving web of packaging material to remove particles therefrom for use in forming individual aseptic containers comprising the steps of (1) directing a moving film of a liquid medium over and in contact with at least one surface of the web having particles thereon, (2) placing an activated sonic horn in sonic energy transfer relationship to the liquid medium while it is still in the form of a film, so that sound waves produced by the activated sonic horn dislodge particles from the web into the liquid medium film on the surface of the web, the liquid medium film, which carries the dislodged particles, being withdrawn from contact with the web so that there is no contact of the liquid medium film on the web with a reservoir of the liquid medium, and becoming no longer in contact with the web surface, whereby the particles which have been dislodged from the web surface are not redistributed over the web by continued contact with the reservoir of liquid medium.

11. An apparatus for sonicating an article to remove particles therefrom comprising means for directing a moving film of a liquid medium over and in contact with a surface of an article, having particles thereon a sonic horn positioned in sonic energy transfer relationship to the liquid medium streamed over the article, means for projecting ultrasonic sound waves through the liquid medium, while the liquid medium is still in the form of a film, and dislodging particles from the article into the liquid medium by the ultra sonic sound waves while the liquid medium is still in the form of a film, the article being positioned so that the liquid medium film while still on the surface of the article, which carries the dislodged particles, is withdrawn from contact with the article so that there is no contact with the liquid medium film on the article with a reservoir of the liquid medium, whereby the particles which have been dislodged from the article surface are not redistributed over the article by continued contact with the reservoir of liquid medium.

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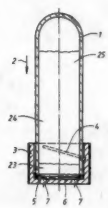
## 4,591,486
## DEVICE SEDIMENTATION OF A SAMPLE LIQUID AND A SAMPLE EXAMINATION SYSTEM

**Günter Eberle, Gartenstrasse 100, 7200 Tuttlingen, Fed. Rep. of Germany**

**Filed May 4, 1984, Ser. No. 607,169**
**Claims priority, application Fed. Rep. of Germany, May 4, 1983, 3316335**
**Int. Cl.[4] G01N** *9/30;* **B01L** *3/00*
**U.S. Cl. 422—72** **18 Claims**




1. Device for sedimentation of a sample liquid, the device comprising a sample tube for containing the sample liquid, said sample tube being formed as a centrifuge tube, a releasable closure means mounted on one end of the centrifuge tube, and a slide means releasably fastened to an inner surface of the closure means for receiving the sedimentation of the sample liquid, said slide means extending transversely of a longitudinal axis of the centrifuge tube with a first surface of said slide means being in abutment with an inner surface of the closure means.

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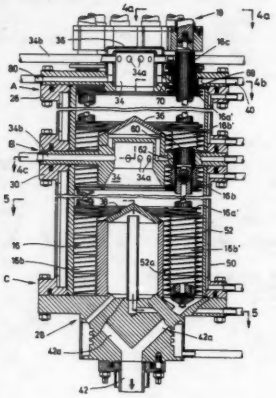
## 4,591,487
## METHOD AND APPARATUS FOR THE CONTINUOUS PRODUCTION OF HIGH-MOLECULAR POLYMERS

**Rudolf P. Fritsch, Goslarer Str. 58, 7000 Stuttgart-31, Fed. Rep. of Germany**

**Continuation of Ser. No. 289,256, Aug. 3, 1981, abandoned. This application Aug. 10, 1983, Ser. No. 522,047**
**Claims priority, application Fed. Rep. of Germany, Mar. 13, 1980, 3030541**
**Int. Cl.[4] B01F** *7/26;* **B01J** *14/00*
**U.S. Cl. 422—134** **7 Claims**

1. Apparatus for the continuous production and devolatilization of high molecular polymers from a substance, said apparatus comprising a casing, a plurality of parallel feeding shafts, means mounting said shafts for rotation in said casing, each of said shafts having at least one screw shaft section and one kneading section, a plurality of kneading disks in each of said kneading sections, the disks of each plurality of being disposed in tandem along the axis of the associated shaft, said disks having a noncircular outline around the associated shaft axis and being relatively angularly oriented in staggered relationship with reference to the associated shaft axis for feeding said substance, said screw shaft section being disposed downstream of said kneading section, said screw shaft section cooperating with said casing to form an extrusion unit, the kneading disks of adjacent shafts meshing with each other to scrape off the substance to be treated from each other, and a devolatilization

chamber within said casing adjacent the kneading sections of said shafts, said devolatilization chamber having an opening for connection to a vacuum source, characterized in that the



kneading disks of each of said shafts mesh with the kneading disks of two adjacent shafts to enclose said devolatilization chamber, and that means are provided for coupling said shafts to each other for rotary movement in the same direction.

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**4,591,488**

**PROCESS FOR SELECTIVE SEPARATION OF PLUTONIUM FROM URANIUM AND OTHER METALS**

**Klaus Heckmann, and Jiri Spurny, both of Regensburg, Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany**

**Filed Jun. 29, 1983, Ser. No. 509,193**

**Claims priority, application Fed. Rep. of Germany, Jul. 2, 1982, 3224803**

**Int. Cl.⁴ C01G** *56/00*

**U.S. Cl. 423—11** **19 Claims**

1. A process for selective separation of plutonium and uranium from solutions comprising the steps of: adding to a solution containing $Pu^{4+}$ and $UO_2^{2+}$ such an amount of nitric acid that the $Pu^{4+}$ forms anionic nitrato-complexes; adding to said solution a cationic compound containing at least one group adapted to assert affinity to polar surfaces and also containing a radical which has little affinity to water; separating the resultant precipitate from the mother liquor; and recovering plutonium from said precipitate.

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**4,591,489**

**PROCESS FOR THE TREATMENT OF HYDROCHLORIC ACID PICKLES CONTAINING IRON AND ZINC**

**Walter Gremm, Mettmann, Fed. Rep. of Germany, assignor to Hamm Chemie GmbH, Duisburg, Fed. Rep. of Germany**

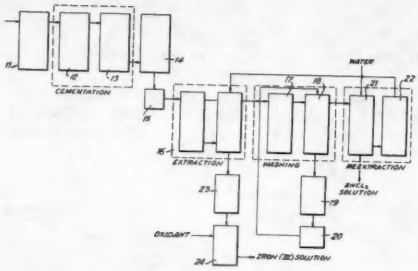
**Filed Oct. 19, 1984, Ser. No. 663,031**

**Claims priority, application Fed. Rep. of Germany, Oct. 21, 1983, 3338258**

**Int. Cl.⁴ C01G** *9/04*

**U.S. Cl. 423—100** **5 Claims**

1. A process for the treatment of a spent hydrochloric acid solution containing dissolved iron and zinc, which process comprises contacting said solution with metallic iron in a first stage such that trivalent iron present in the solution is reduced to divalent iron and whereby a pH value of about 3 is established, next, in a second stage contacting said solution containing dissolved zinc and divalent iron with metallic zinc, and then extracting zinc, as zinc chloride, from the resulting aque-




ous phase with an organic liquid containing a complexing agent for zinc chloride.

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**4,591,490**

**REMOVAL OF MERCURY FROM GASES**

**Robert L. Horton, South Russel, Ohio, assignor to Phillips Petroleum Co., Bartlesville, Okla.**

**Filed Oct. 19, 1984, Ser. No. 662,737**

**Int. Cl.⁴ B01D** *47/00, 19/00;* **B01J** *8/00;* **C08D** *5/20*

**U.S. Cl. 423—210** **12 Claims**

1. A method for removing mercury from a gas comprising contacting said gas with a basic anion exchange resin where said resin has been treated with a polysulfide solution.

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**4,591,491**

**PROCESS FOR THE CONTINUOUS CONVERSION OF META-KAOLIN INTO VERY FINELY-DIVIDED ZEOLITIC SODIUM ALUMINO-SILICATE**

**Peter Christophliemk, Dusseldorf, and Willi Wüst, Ratingen-Hösel, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf, Fed. Rep. of Germany**

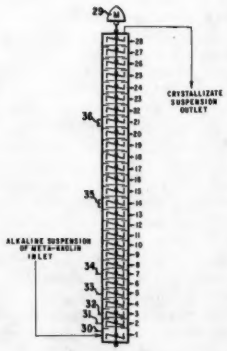
**Continuation-in-part of Ser. No. 395,643, Jul. 6, 1982, abandoned. This application Jul. 11, 1984, Ser. No. 628,969**

**Claims priority, application Fed. Rep. of Germany, Feb. 4, 1982, 3203777**

**The portion of the term of this patent subsequent to Feb. 1, 2000, has been disclaimed.**

**Int. Cl.⁴ C01B** *33/28*

**U.S. Cl. 423—329** **24 Claims**




1. In a continuous process for the conversion of meta-kaolin into an aqueous alkaline suspension of low-grit, water-contain-

ing, zeolitic sodium aluminosilicate of the smallest particle size having the molar composition:

$$0.9 \text{ to } 1.1\ Na_2O{:}1\ Al_2O_3{:}1.8 \text{ to } 2.3\ SiO_2$$

with a water content depending on the degree of drying, which contains at least 99.8% by weight of a particle size of less than 25 $\mu$ and has a high cation exchange capability comprising:

(a) reacting meta-kaoline with sodium hydroxide at elevated temperatures,

(b) in a first aqueous alkaline suspension having a composition corresponding to the molar rations of:

$$1.5 \text{ to } 5\ Na_2O{:}1\ Al_2O_3{:}1.8 \text{ to } 2.3\ SiO_2{:}40 \text{ to } 200\ H_2O,$$

and

(c) recovering said aqueous, alkaline suspension of zeolitic sodium aluminosilicate, the improvement consisting of:

(d) slowly heating said first suspension from a charging temperature of 50° C. or below to a zeolitization temperature in the range of from 70° C. to 100° C., with a temperature rise averaging 20° C. within a period of from two to ten minutes,

(e) feeding the first suspension continuously into a reactor heated to said aeolitization temperature and having progressively, separately zoned mixing areas with a stage-like effect and having at least seven stages while mixing said suspension sufficiently in the respective stages to avoid sedimentation,

(f) passing said heated suspension through the reactor at a preselected temperature in the range of from 70° C. to 100° C. at such a rate and time until the degree of crystallization of the aeolitic sodium aluminosilicate, determined by X-ray has reached at least 80% of the theoretically possible crystallinity, and

(g) continuously removing an aqueous, alkaline suspension of zeolite sodium aluminosilicate from the end opposite of the intake end of the reactor.

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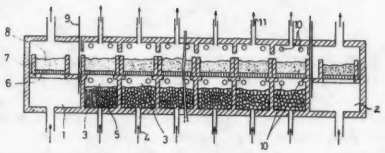
## 4,591,492
## METHOD OF MANUFACTURING CRYSTALLINE SILICON CARBIDE EMPLOYING ACID PRETREATED RICE HUSKS

**Minoru Tanaka, Kobe; Tadashi Kawabe, and Masafumi Kobune, both of Hyogo, all of Japan, assignors to Tateho Kagaku Kogyo Kabushiki Kaisha, Hyogo, Japan**

**Continuation-in-part of Ser. No. 476,199, Mar. 17, 1983, Pat. No. 4,504,453. This application Jan. 7, 1985, Ser. No. 689,469**
**Claims priority, application Japan, Jun. 4, 1982, 57-96791**
**The portion of the term of this patent subsequent to Mar. 12, 2002, has been disclaimed.**
**Int. Cl.⁴ C01B *31/36***
**U.S. Cl. 423—345** **9 Claims**



1. In a method for manufacturing silicon carbide wherein rice husks are employed as a silicon and carbon containing raw material, the improvement comprising:

(a) pretreating said rice husk raw material by admixing therewith an acid solution;

(b) maintaining said rice husk raw material in the presence of said acid solution for a period of at least one-half hour;

(c) removing said acid solution from said rice husk raw material;

(d) arranging the acid treated raw material on a gas-permeable, heat-resistant support in a manner allowing the passage of a gas through said raw material;

(e) placing the material-bearing support in an air tight furnace, said air tight furnace adapted to provide at least three temperature zones covering the range of about 400° C. to a high of at least 1,350° C., each of said temperature zones having a substantially different temperature;

(f) moving said material-bearing support successively through said temperature zones, in the direction of increasing temperature;

(g) maintaining said material-bearing support means in each of said temperature zones for at least one hour;

(h) passing a non-oxidizing gas through the heated material to remove impurities while the material is in each temperature zone below 1,300° C.; and,

(i) removing silicon carbide whisker-containing material from said furnace.

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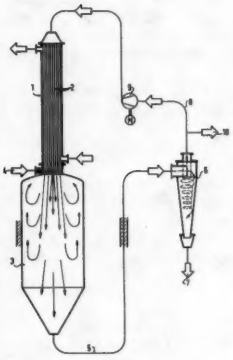
## 4,591,493
## PROCESS FOR OBTAINING SOLID CYANURIC CHLORIDE

**Hubertus Klima, Tacherting, and Herbert Jekat, Schopfheim, both of Fed. Rep. of Germany, assignors to SKW Trostberg Aktiengesellschaft, Trostberg, Fed. Rep. of Germany**

**Filed Mar. 22, 1985, Ser. No. 714,957**
**Claims priority, application Fed. Rep. of Germany, Apr. 13, 1984, 3414097**
**Int. Cl.⁴ C01B *21/088***
**U.S. Cl. 423—383** **11 Claims**



1. A process for obtaining finely divided high purity solid cyanuric chloride from a cyanuric chloride vapour containing reaction mixture resulting from the catalytic trimerization of cyanogen chloride and including unreacted cyanogen chloride or chlorine or a mixture thereof, comprising the steps of:

introducing a stream of the cyanuric chloride vapor containing reaction mixture into the upper part of a separation chamber in the center of a plurality of individual cold inert gas streams of gas which does not react with cyanuric chloride, said gas streams being cool relative to the cyanuric chloride vapor containing reaction mixture and mixing therewith within the chamber to crystalize the cyanuric chloride,

removing the gas streams and cyanuric chloride from the separation chamber and separating the cyanuric chloride crystals from the inert gas stream from recovery, and

cooling the inert gas, together with residual content of very finely crystalline cyanuric chloride for return to the separation chamber to comprise the inert gas streams.

**4,591,494**

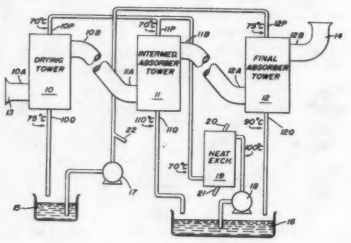
## METHOD AND APPARATUS FOR MAKING SULPHURIC ACID

**Gordon M. Cameron, North York, and Edward G. C. Lyne, Scarborough, both of Canada, assignors to C-I-L, North York, Canada**

**Continuation of Ser. No. 463,529, Feb. 3, 1983, abandoned. This application Apr. 23, 1985, Ser. No. 726,287**

**Int. Cl.[4] C01B** *17/98, 17/74, 17/48*

**U.S. Cl. 423—522** **7 Claims**




5. In a double absorption process for manufacturing sulphuric acid, in which a gas stream flows through a drier to remove $H_2O$ therefrom, is used to burn sulphur to form $SO_2$ therein, a portion of the $SO_2$ then being converted to $SO_3$, the gas stream then passing through an intermediate absorber for removal of said $SO_3$ therefrom, essentially all of the remaining $SO_2$ in said gas stream then being converted to further $SO_3$, said gas stream then passing through a final absorber for removal of said further $SO_3$, said gas stream being contacted with sulphuric acid streams in said drier and in both said absorbers, the improvement comprising:

(a) flowing acid from said drier directly to said final abosrber,

(b) joining the acid streams from said final absorber and said intermediate absorber together to form a combined acid stream,

(c) cooling said combined acid stream to form a cooled acid stream,

(d) and dividing said cooled acid stream and flowing a portion thereof to said drier and a portion thereof to said intermediate abosrber,

(e) while maintaining the acid supply to the drier, intermediate absorber and final absorber roughly in the proportion of 1:2:1.

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**4,591,495**

## METHOD AND APPARATUS FOR MAKING SULPHURIC ACID

**Gordon M. Cameron, North York, Canada, assignor to C-I-L Inc., North York, Canada**

**Filed Aug. 29, 1985, Ser. No. 770,673**

**Int. Cl.[4] C01B** *17/98, 17/74, 17/48*

**U.S. Cl. 423—522** **5 Claims**

1. apparatus for making sulphuric acid from sulphur, comprising a drying tower, an intermediate absorber tower, and a final absorber tower; each tower having an acid inlet and an acid outlet; wherein the apparatus includes

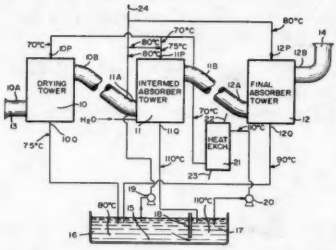
means for feeding acid discharged form said outlets of both reservoir;

means for feeding acid discharged from said outlet of said intermediate absorber tower into a separate reservoir;

a heat exchanger;

a first means for pumping acid from said separate reservoir through said heat exchanger and then into said inlets of both said drying tower and said intermediate absorber tower a second pumping means for pumping acid from said common reservoir into said inlets of both said intermediate absorber tower and said final absorber tower, both pumping means being of equal capacity; means for dividing the flow of said acid from said first pumping means into equal streams A and B;

means for dividing the flow of said acid from said second pumping means into equal streams C and D;




means for feeding streams B and D to said intermediate absorber tower; means for feeding stream C to said final absorber tower; means for feeding stream A to said drying tower; and means for connecting said separate reservoir and said common reservoir.

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**4,591,496**

## PROCESS FOR MAKING SYSTEMS FOR THE CONTROLLED RELEASE OF MACROMOLECULES

**Jonathan M. Cohen, Elmont, N.Y.; Ronald Siegel, Arlington Hts., and Robert Langer, Somerville, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Jan. 16, 1984, Ser. No. 571,007**

**Int. Cl.[4] A61K** *31/74, 9/28, 9/22, 9/26*

**U.S. Cl. 424—15** **7 Claims**

1. A method for making a glass-like matrix useful as a delivery system for the controlled release of biologically active substances comprising the steps of:

preparing a polymeric material in powder form at a temperature below its glass transition temperature, said polymeric material having limited water sorptivity;

preparing a swellable biologically active substance in powder form at a temperature less than the minimal temperature at which substantial degradation of the substance occurs;

combining said polymeric material powder and said biologically active substance powder as a mixture in ratios ranging from 97–10 parts polymeric material powder by weight to 3–90 parts biologically active substance powder by weight; and

compressing said mixture to form a solid, glass-like matrix, said compression occurring at a temperature greater than the glass transition temperature of said polymeric material but less than the minimal temperature for substantial degradation of said biologically active substance.

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**4,591,497**

## ODOR-REMOVING AND DEODORIZING COMPOSITION EMPLOYING A HYDROLYSATE OF KERATIN MATERIAL

**Sachio Naito, Tokyo, and Toshiyuki Nemoto, Ichikawa, both of Japan, assignors to Kao Corporation, Tokyo, Japan**

**Continuation of Ser. No. 416,618, Sep. 10, 1982, abandoned. This application Jul. 13, 1984, Ser. No. 630,341**

**Claims priority, application Japan, Sep. 18, 1981, 56-147456**

**Int. Cl.[4] A61L** *9/01, 9/04*

**U.S. Cl. 424—43** **10 Claims**

1. An odor-removing and deodorizing composition comprising:

(a) 0.1 to 10% of a keratin hydrolysate having an average molecular weight of about 200–5000 which is obtained by

subjecting a material selected from the group consisting of wool, animal hair, feathers, nails, horns, hooves and scales to a hydrolysis step with an inorganic acid or an inorganic alkali, at an appropriate temperature for sufficient time to obtain said keratin hydrolysate; said acid hydrolysis being carried out at between about 120° to 130° C., and said alkaline hydrolysis being carried out about 60° C.; and

(b) an additive.

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4,591,498

## SHAMPOO COMPOSITION

Jiro Kawase, and Takao Tokano, both of Funabashi, Japan, assignors to KAO Corporation, Tokyo, Japan

Filed Oct. 17, 1984, Ser. No. 661,783

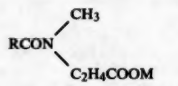
Claims priority, application Japan, Oct. 18, 1983, 58-194954

Int. Cl.[4] C11D *1/18, 1/38, 1/50;* A61K *7/06*

U.S. Cl. 424—70 9 Claims

1. In a shampoo composition of the type which comprises 5–30 wt % of an agent selected from the group consisting of an anionic surface active agent, an amphoteric surface active agent and a mixture thereof as a base, the improvement comprising adding:

(A) 0.5 to 10 wt % of an N-acyl-N-methyl-beta-alanine or its alt represented by the formula (I)



(I)

in which

R represents a linear or branched, saturated or unsaturated hydrocarbon group having from 7 to 21 carbon atoms, and

M represents hydrogen, an alkali metal, ammonium, alkyl-substituted ammonium with an alkyl moiety having from 1 to 3 carbon atoms, alkanolamine having a hydroxyalkyl group having from 1 to 3 carbon atoms, and basic amino acid, and

(B) 0.5 to 20 wt % of one or more of ethylene oxide-added type nonionic surface active agents selected from the group consisting of polyoxyethylene alkyl or alkenyl ethers, polyoxyethylene alkylphenyl ethers, polyoxyethylene fatty acid esters, and polyoxyethylene hardened castor oils.

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4,591,499

## METHOD FOR TREATMENT AND PREVENTION OF MASTITIS

Leighton L. Linn, Andrew County, Mo., and Robert J. Mathiesen, Douglas County, Nebr., assignors to J. B. Lima, Inc., St. Joseph, Mo.

Filed Jan. 20, 1984, Ser. No. 572,707

Int. Cl.[4] A61K *39/00, 37/00, 39/02*

U.S. Cl. 424—93 25 Claims

1. A method of controlling mastitis in mammals, said method comprising:

introducing into the mammary gland of said mammals a non-toxic amount of one or more non-pathogenic lactic-acid producing live bacteria wherein said amount is sufficient to control mastitis;

allowing said bacteria to remain in said gland in a viable state until milk present in the gland is clabbered; and

removing the clabbered milk from said gland.



4,591,500

## TABLET HAVING THE SHAPE OF A CAPSULE, PROCESS AND DEVICE FOR ITS PREPARATION

Bruno Scapinelli, Lamorlaye, France, assignor to Microencapsulation S.A., Chiasso, Switzerland

Division of Ser. No. 488,457, Apr. 25, 1983, abandoned. This application Oct. 2, 1984, Ser. No. 656,968

Int. Cl.[4] A61K *9/20, 9/44*

U.S. Cl. 424—15 3 Claims

1. Pharmaceutical tablet, consisting essentially of a blend of one or more excipients and one or more active substances in the form of granules or microgranules, compressed into the shape of a capsule comprising two semicapsules, each provided with a head or ogive, and having a step at the juncture between the two semicapsules which together form the tablet.

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4,591,501

## COSMETIC AND PHARMACEUTICAL SHEET MATERIAL CONTAINING POLYPEPTIDES

Gheorghe Cioca, Coatesville, Pa., assignor to Seton Company, Newark, N.J.

Continuation of Ser. No. 459,209, Jan. 19, 1983, which is a division of Ser. No. 253,739, Apr. 13, 1981, abandoned. This application May 16, 1984, Ser. No. 610,617

Int. Cl.[4] A61K *9/70;* A61F *13/00;* A61L *15/03*

U.S. Cl. 424—28 6 Claims

1. In the method of cosmetically treating human skin by applying polypeptides topically thereto, the improvement comprising:

(a) contacting the skin with a water-moistened sheet material in the form of a cosmetic face mask, consisting essentially of water-moistened polypeptides formed of a flexible continuous film which, moistened, exudes said polypeptide while remaining as a continuous film, comprising a homogeneous physical admixture of:

(i) a polypeptide selected from the group consisting of collagen, elastin and polypeptides derived from collagen and elastin and having a molecular weight of at least 2,000 to 20,000, wherein when said polypeptide is derived from collagen and elastin it is present at a level of 25 to 75 percent by weight based on the weight of the admixture and when said polypeptide is collagen or elastin it is present at a level of 3 to 5 percent by weight based on the weight of said admixture;

(ii) 20 to 40 percent by weight of glycerol, dipropylene glycol, diethylene glycol, or mixtures thereof, as a water soluble non-volatile plasticizer having a boiling point in excess of about 150° C.; and

(iii) 10 to 20 percent by weight of a film-forming polyvinyl alcohol which is soluble in hot water and insoluble in cold water;

for a time sufficient to allow said polypeptides to exude from said sheet material onto said skin; and

(b) removing said sheet material from said treated skin.

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4,591,502

## COMPRESSING AID FOR COSMETIC POWDERS

Mitchell L. Schlossman, 20 Lake Shore Dr., Rockaway, N.J. 07866

Filed Nov. 24, 1982, Ser. No. 444,451

Int. Cl.[4] A61K *7/021;* C08J *3/02*

U.S. Cl. 424—63 6 Claims

1. A compressing aid for cosmetic pressed powders, said aid consisting essentially of particles of a synthetic saturated hydrocarbon wax having an average molecular formula of $C_{48}H_{98}$, an average molecular mass of about 700, a minimum congealing point of about 204° F., and an average particle size of about 10 microns, said wax particles being coated with an amount of lubricant equal to from about 0.1 to 1.0% of the weight of said wax, said lubricant selected from the group consisting of dimethyl polysiloxane, isopropyl myristate, lauryl lactate and ethylhexyl palmitate.

2. In a cosmetic pressed powder comprising a powder component, a pigment component and a compressing aid, the improvement which comprises a compressing aid consisting essentially of particles of a synthetic saturated hydrocarbon wax having an average molecular formula of $C_{48}H_{98}$, an average molecular mass of about 700, a minimum congealing point of about 204° F. and an average particle size of about 10 microns, and wherein the amount of said wax used is effective to impart compressibility and adhesion to the powder.

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**4,591,503**

## COMPOSITION FOR IMPROVED ABSORPTION OF 2A CATIONS AND GOLD COMPRISING YEAST OR LACTOBACILLUS

**Georges S. Grimberg, 123 rue de l'Université , 75007 Paris, France**

**Filed Nov. 28, 1983, Ser. No. 555,335**

**Claims priority, application France, Dec. 1, 1983, 82 20124**

**Int. Cl.[4] A61K** *33/30, 33/26, 37/00, 33/00, 33/38, 33/36*

**U.S. Cl. 424—93** **8 Claims**

1. A method for improving the absorption of pharmaceutical metallic cations in a mammal, comprising the steps of admixing a pharmaceutically acceptable salt of a metallic cation selected from the group consisting of divalent and gold cations with an amount of pharmaceutically acceptable yeast or bacillus of the lactobacillus type effective to significantly increase the percentage of said metallic cation absorbed by said mammal over the percentage of said metallic cation which would be absorbed by said mammal if said metallic cation were administered without said yeast or lactobacillus to form a pharmaceutically acceptable medication, and orally administering a therapeutically effective amount of said medication to said mammal.

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**4,591,504**

## HUMAN LEUCOCYTE PEPSIN-LIKE ENZYME AS A THERAPEUTIC AGENT FOR TREATING ALLERGIC DISORDERS AND IMMUNE COMPLEX DISEASES

**Haruo Ohnishi, Funabashi; Hiroshi Kosuzume, Yokohama; Yasuo Suzuki, Kawaguchi, and Ei Mochida, Tokyo, all of Japan, assignors to Mochida Pharmaceutical Co., Ltd., Tokyo, Japan**

**Filed May 26, 1983, Ser. No. 498,506**

**Claims priority, application PCT Int'l Appl., May 31, 1982, PCT/JP82/00213**

**Int. Cl.[4] A61K** *37/48;* **C12N** *9/48*

**U.S. Cl. 424—94** **11 Claims**

1. A human leucocyte enzyme having the following properties:

(a) molecular weight of 35,000 to 41,000,

(b) isoelectric point of pH 2.5 to 3.5,

(c) maximum absorption at 278 nm,

(d) positive ninhydrin reaction,

(e) readily soluble in water and insoluble in ether and chloroform,

(f) white powdery appearance,

(g) anti-allergic and anti-immune complex disease activity, and

(h) a high hydrolytic activity to hemoglobin in the acidic range,

in substantially purified form.

2. A therapeutic composition for treating allergy and immune complex disease comprising a pharmaceutical carrier and an effective amount of the enzyme as set forth in claim 1.

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**4,591,505**

## PROCESS FOR INACTIVATING HEPATITIS B VIRUS

**Alfred M. Prince, Pound Ridge, N.Y., assignor to New York Blood Center, Inc., New York, N.Y.**

**Division of Ser. No. 368,250, Apr. 14, 1982, Pat. No. 4,481,189. This application Feb. 21, 1984, Ser. No. 581,528**

**Int. Cl.[4] A61K** *35/16*

**U.S. Cl. 424—101** **11 Claims**

1. A process for inactivating the hepatitis B virus in mammalian blood plasma or a concentrate therefrom which comprises contacting said blood plasma or a concentrate therefrom with effective amounts of alcohol and a virus inactivating agent selected from the group consisting of a nonionic detergent, ether and a mixture of a nonionic detergent and ether, at a temperature of between −5° C. and 50° C. and for a time of at least one minute to thereby inactivate the hepatitis B virus.

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**4,591,506**

## ORAL INGESTION OF INDIUM

**George A. H. Bonadio, 373 East Ave., Watertown, N.Y. 13601**

**Division of Ser. No. 354,947, Mar. 5, 1982, which is a continuation of Ser. No. 55,543, Jul. 9, 1979, abandoned, which is a continuation-in-part of Ser. No. 869,579, Jan. 16, 1978, Pat. No. 4,182,754, which is a continuation-in-part of Ser. No. 732,491, Oct. 14, 1976, abandoned. This application Jul. 18, 1983, Ser. No. 514,496**

**The portion of the term of this patent subsequent to Jan. 8, 1997, has been disclaimed.**

**Int. Cl.[4] A61K** *33/24, 31/28*

**U.S. Cl. 424—131** **7 Claims**

1. A method of enhancing the detoxification rate of the liver due to alcohol of a human by orally administering to a human in need thereof indium or a digestible compound selected from the group consisting of indium acetate, indium carbonate, indium chelate, indium chloride, indium glutanate, indium phosphate, indium palmitate and indium sulphate in a daily average amount of about 0.25–25 mg.

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**4,591,507**

## EDIBLE WATER-IN-OIL EMULSION SPREADS CONTAINING HYDRATED STARCH PARTICLES DISPERSED IN THE AQUEOUS PHASE

**Janos Bodor, The Hague; Lammert Heslinga, Maassluis; Jan van Heteren, Vlaardingen, and Bartholomeus de Vries, Arnhem, all of Netherlands, assignors to Lever Brothers Company, New York, N.Y.**

**Filed Nov. 30, 1984, Ser. No. 677,005**

**Claims priority, application Netherlands, Dec. 1, 1983, 8304133**

**Int. Cl.[4] A23D** *3/00, 3/02*

**U.S. Cl. 426—604** **17 Claims**

1. An edible water-in-oil emulsion spread comprising a continuous fat phase and a dispersed phase, of which 15–80% by volume of the dispersed phase is present in the form of undissolved, intact, non-crystalline, hydrated starch, the remainder of the volume of said dispersed phase being present as free aqueous phase.

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**4,591,508**

## COFFEE PRODUCT AND PROCESS

**Edmund P. Pultinas, Jr., Cincinnati, Ohio, assignor to The Procter & Gamble Co., Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 348,523, Feb. 12, 1982, abandoned, which is a continuation-in-part of Ser. No. 320,163, Nov. 10, 1981, abandoned, which is a continuation-in-part of Ser. No. 284,856, Jul. 20, 1981, abandoned. This application Apr. 9, 1982, Ser. No. 366,902**

**Int. Cl.[4] A23F** *5/10*

**U.S. Cl. 426—595** **12 Claims**

1. Roast and ground coffee particles having improved extractability, characterized by:

(a) a thickness of about 30 to about 40 mils (0.75 to 1.02 mm.);

(b) a bulk density of about 0.40 to about 0.46 g./cc.;

(c) a coarse particle size distribution such that from about 15% to about 48% by weight is retained on a No. 12 U.S. Standard Sieve, from about 20% to about 42% by weight is retained on a No. 16 U.S. Standard Sieve, from about 10% to about 25% by weight is retained on a No. 20 U.S. Standard Sieve, from about 2% to about 15% by weight is

retained on a No. 30 U.S. Standard Sieve, and from about 5% to about 20% by weight pass through a No. 30 U.S. Standard Sieve; and

(d) a container aroma intensity of about 30,000 to about 55,000 G.C. counts.

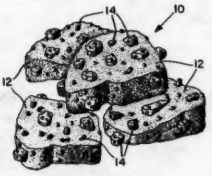
8. A method for making an improved roast and ground coffee product, comprising the steps of:

(a) roasting coffee beans to a color of from about 18 to about 23 on the Hunter "L" scale;

(b) cooling the roast beans to a temperature below about 65° F. (18° C.);

(c) coarsely grinding the cooled beans such that

from about 40% to about 95% by weight is retained on a No. 12 U.S. Standard Sieve,




from 0% to about 37% by weight is retained on a No. 16 U.S. Standard Sieve,

from 0% to about 12% by weight is retained on a No. 20 U.S. Standard Sieve;

from 0% to about 10% by weight is retained on a No. 30 U.S. Standard Sieve;

from 0% to about 8% by weight pass through a No. 30 U.S. Standard Sieve;

(d) milling the ground beans, at a temperature below about 80° F. (27° C.), to provide roast and ground coffee particles in which those particles retained on a No. 16 U.S. Standard Sieve have a particle thickness of about 30 to about 40 mils (0.75 to 1.02 mm.).

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**4,591,509**

## PROCESS FOR THE PREPARATION OF SUPERCONDUCTING COMPOUND MATERIALS

**Berthold Krevet, Dettenheim-Liedolsheim; Wolfgang Schauer, Pfinztal, and Fritz Wüchner, Germersheim, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Fed. Rep. of Germany**

**Continuation of Ser. No. 432,377, Sep. 30, 1982, abandoned, which is a division of Ser. No. 246,050, Mar. 20, 1980, Pat. No. 4,386,115. This application Jul. 5, 1984, Ser. No. 627,940**

**Claims priority, application European Pat. Off., Mar. 27, 1980, 80101648.6**

**Int. Cl.⁴ B05D *5/12***

**U.S. Cl. 427—62** **11 Claims**

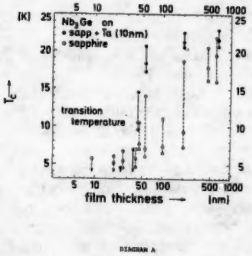


DIAGRAM A

1. In a process for the preparation of a composite material containing a substrate and a metallic layer of a metastable or unstable $Nb_3Ge$ phase strongly adhering to the substrate surface, and being deposited onto the substrate from the gas or vapor phase, the improvement comprising:

(a) using very pure niobium and germanium components for formation of the metastable or unstable phase, having respective impurity concentrations of less than 100 ppm, by weight;

(b) effecting an initial deposition of the layer to a layer thickness of about 5 to 20 nm by simultaneously depositing niobium and germanium on the substrate, while reducing the mobility of the components on the substrate to thereby promote germination of a subsequently deposited A15 $Nb_3Ge$ phase, the reduction of mobility being effected by coating the substrate surface, prior to initial deposition of the components, with a heavy metal oxide layer of chromium oxide; and

(c) providing the substrate containing the intially deposited layer of the components with a temperature at which a metastable or unstable phase is formed and despositing the components up to a total layer thickness of no more than 200 nm, from the gas or vapor phase onto the substrate to produce the subsequently deposited A15 $Nb_3Ge$ phase.

7. In a process for the preparation of a composite material containing a substrate and a metallic layer of a metastable or unstable $Nb_3Ge$ phase strongly adhering to the substrate surface, and being deposited onto the substrate from the gas or vapor phase, the improvement comprising:

(a) using very pure niobium and germanium components for formation of the metastable or unstable phase, having respective impurity concentrations of less than 100 ppm, by weight;

(b) effecting an initial deposition of the layer to a layer thickness of about 5 to 20 nm by simultaneously depositing niobium and germanium by physical vapor deposition on the substrate while reducing the mobility of the components on the substrate to thereby promote germination of a subsequently deposited A15 $Nb_3Ge$ phase, the reduction of mobility being effected by coating the substrate surface, prior to initial depositing of the components, with a heavy metal oxide layer of tantalum oxide in a thickness of at least 5 nm and;

(c) providing the substrate containing the initially deposited layer of the components with a temperature at which a metastable or unstable phase is formed and depositing by physical vapor deposition the components, from the gas or vapor phase onto the substrate to produce the subsequently deposited A15 $Nb_3Ge$ phase, said subsequently deposited A15 Nb3Ge phase having a $T_c$ of 22 to 23° K., and wherein the depositions of steps (b) and (c) are performed without using an oxygen impurity and wherein the total final combined thickness of the initially deposited layer of $Nb_3Ge$ and the subsequently deposited $Nb_3Ge$ layer added together is no more than 80 nm.

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**4,591,510**

## RUSTY BOLT INTERMODULATION INTERFERENCE REDUCER

**Ramanathan Panayappan, Potomac, Md., and John C. Cooper, Burke, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 12, 1985, Ser. No. 722,579**

**Int. Cl.⁴ B05D *5/12***

**U.S. Cl. 427—125** **12 Claims**

1. A method for reducing Intermodulation Interference which comprises the steps of:

contacting a metal-oxide-metal junction with a Chemical Bonding Agent composition comprising between about 10 and 60 percent by weight of a transition metal ion-amine-halogen chelating agent, between about 2 and 30 percent by weight of a polymerizable bonding agent, and between about 40 and 90 percent by weight of a high dielectric solvent;

allowing said composition to penetrate the metal-oxide-

metal junction by chelating the metal ions in said metal-oxide-metal junction with said chelating agent;

allowing said composition to reduce said metal ions in said metal-oxide-metal junction to zero-valent metal thereby producing a conductive mixture; and

allowing said composition to inhibit future metal-oxide-metal junctions by cross-linking said polymerizable amine bonding agent thus forming a hardened material which remains in place to form a linear conductive path between the metal-metal junction.

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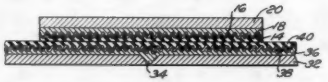
**4,591,511**

## ADHESIVE REPAIR PATCH

**Leighton H. Peebles, Jr., Annandale, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jul. 30, 1984, Ser. No. 635,866**
**Int. Cl.[4] B32B *35/00***
**U.S. Cl. 427—142** **6 Claims**



1. A process for adhesive joint formation to repair a damaged portion of a machinery including an aircraft which includes the steps of:

preparing a repair patch under controlled conditions by forming an oxide layer on a metallic sheet and covering said oxide layer with an inhibitor layer;

forming a protective backing for storing said repair patch for use to repair the damaged portion under field conditions;

preparing said portion of said machinery including putting an adhesive layer thereon;

mating said repair patch after removing protective backing thereof with the damaged portion of said machinery; and

curing the adhesive layer on the damaged portion of said machinery.

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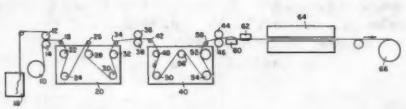
**4,591,512**

## METHOD OF MAKING LIGHT POLARIZER

**James L. Racich, Natick; Norman W. Schuler, Lexington, and Giorgio B. Trapani, Cambridge, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Jan. 25, 1985, Ser. No. 694,921**
**Int. Cl.[4] B05D *5/06*; G02B *5/30***
**U.S. Cl. 427—163** **5 Claims**



1. A method of making a light polarizing element comprising the steps of

immersing a uniaxially stretched film of polyvinyl alcohol in an iodine stain solution, and

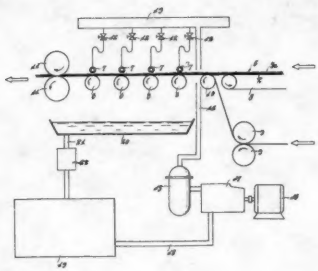
restretching said stained film in substantially the previously uniaxially stretched direction while immersing it in a borating solution comprising an aqueous solution of boric acid, potassium iodide and zinc ion.

**4,591,513**

## FIBRE-IMPLANTED NONWOVEN FABRIC AND METHOD FOR PRODUCTION THEREOF

**Migaku Suzuki; Toshio Kobayashi; Satoshi Sasaki, and Shigeo Imai, all of Ehime, Japan, assignors to Uni-Charm Corporation, Ehime, Japan**

**Division of Ser. No. 460,908, Jan. 25, 1983, Pat. No. 4,532,173.**
**This application Apr. 17, 1985, Ser. No. 724,483**
**Claims priority, application Japan, Jan. 31, 1982, 57-13531**
**Int. Cl.[4] B05D *1/14***
**U.S. Cl. 427—200** **6 Claims**



1. A method for the procuction of fibre-implanted nonwoven fabric comprising steps of

(a) laying a fibrous web having a fibre length shorter than 100 mm and a basic weight of 5 to 80 g/m$^2$ upon a foamed sheet of a thickness less than 5 mm and of open pore type to thereby form an initial material to be treated,

(b) introducing said initial material to be treated onto a water-impermeable support having a hard smooth surface,

(c) subjecting said initial material to be treated to high energy treatment with a plurality of water jet streams supplied at a jet pressure higher than 15 kg/cm$^2$, with said foamed sheet being stretched by 10% or more, said jet streams being arranged at a given pitch transversely of said initial material to be treated and above said supports, said water jet streams being columnar streams jetted vertically downward against said initial material from the side of said fibrous web so that the short fibres of said fibrous web may be implanted from at least one surface of said foamed sheet deeply into the interior thereof in a striped pattern defined by alternately arranged zones of high density and low density and so that said short fibres may be not only mutually entangled on said surface, but also be interlocked with material of said foamed sheet on said surface, as well as in the interior of said foamed sheet.

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**4,591,514**

## METHOD FOR MAKING SELF-PROTECTING CARBON BODIES

**Robert A. Holzl, La Canada, Calif., assignor to Air Products and Chemicals, Inc., Allentown, Pa.**

**Division of Ser. No. 416,628, Sep. 10, 1982, Pat. No. 4,515,860.**
**This application Feb. 13, 1985, Ser. No. 701,065**
**Int. Cl.[4] C23C *16/32, 16/34***
**U.S. Cl. 427—249** **3 Claims**

1. A method for coating a body of carbon material to provide an oxidation resistant silicon alloy coating, comprising, providing a volatile gaseous halide of silicon, partially reducing said halide to form a lower halide of silicon in a first reaction zone, said first reaction zone having a first pressure and separated from said substrate, flowing said lower halide into a second reaction zone maintained at a pressure lower than the pressure in said first reaction zone, providing in said second reaction zone a gaseous alloying agent including one or more elements selected from the group consisting of carbon, oxygen,

aluminum and nitrogen, depositing a liquid phase intermediate compound on said substrate body and thermochemically reacting said liquid phase to produce a coating of silicon alloy having a non-columnar grain distribution with substantially equiaxial grains of an average diameter of less than one micron, thereby forming a correspondingly fine crack mosaic upon stressing due to differences in thermal coefficients of expansion between the coating and the body, said lower halide and said alloying agent being controlled so as to produce a coating wherein the amount of silicon is substantially in excess of stoichiometry.

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## 4,591,515
## METHOD OF IMPREGNATING WOOD

**David J. Dickinson, Haywards Heath, and Scarlette M. Gray, Colchester, both of England, assignors to National Research Development Corp., London, England**

**PCT No. PCT/GB83/00146, § 371 Date Jan. 27, 1984, § 102(e) Date Jan. 27, 1984, PCT Pub. No. WO83/04212, PCT Pub. Date Dec. 8, 1983**

**PCT Filed May 25, 1983, Ser. No. 584,260**

**Claims priority, application United Kingdom, May 27, 1982, 8215571; Apr. 22, 1983, 8310973**

**Int. Cl.[4] B05D** *3/00*

**U.S. Cl. 427—297** **4 Claims**

1. A method of impregnating wood to protect it against fungal decay, which method comprises a first stage of impregnating the wood with a solution of a copper compound and with a fixative agent for the copper compound, but in the substantial absence of arsenic, followed by a second stage of impregnating the wood with a solution containing an arsenic compound, both said impregnations being carried out at a temperature of from 10° to 35° C., and wherein in the first stage the fixative agent comprises (a) a chromium (VI) compound or (b) ammonia or an ammonia-releasing compound, and in the case of (b) the second stage further comprises impregnating the wood with a fixative agent for the arsenic compound comprising a chromium (VI) compound or ammonia or an ammonia-releasing compound.

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## 4,591,516
## INORGANIC BINDER COMPOSITION AND REFRACTORY-BINDER COATED FABRIC COMPOSITIONS PREPARED THEREFROM

**Stephen George, and Thomas H. George, both of Clinton, N.J., assignors to Subtex, Inc., New York, N.Y.**

**Division of Ser. No. 585,909, Mar. 2, 1984, Pat. No. 4,507,355. This application Jan. 4, 1985, Ser. No. 688,693**

**Int. Cl.[4] B05D** *3/02*

**U.S. Cl. 427—375** **3 Claims**

1. A method of preparing a heat resistant refractory coated fabric composition comprising:

(a) coating the surface of a base fabric with a heat resistant refractory coating comprising refractory materials and an inorganic binder composition comprising
  (i) colloidal silica,
  (ii) monoaluminum phosphate
  (iii) aluminum chlorohydrate, and
  (iv) an amount of an alkyl tin halide catalyst
  effective to increase the bonding of said composition when applied to a substrate, and

(b) heating the refractory coating for a period of time effective to provide the fabric with a dry refractory coating.

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## 4,591,517
## WEB DRYER WITH VARIABLE VENTILATION RATE

**Rodger E. Whipple, Neenah, Wis., and Richard H. Curtis, Gorham, Me., assignors to Overly, Inc., Neenah, Wis.**

**Filed Jun. 8, 1984, Ser. No. 618,585**

**Int. Cl.[4] B05D** *3/04*

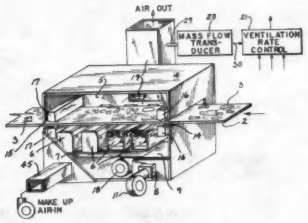
**U.S. Cl. 427—378** **54 Claims**

1. The method of drying a continuously traveling web of paper or the like having ink or the like applied thereon, comprising the steps of:

(a) driving said web through a generally enclosed dryer housing forming a dryer chamber therein and wherein said housing has web slots therein,

(b) providing heated drying air through an inlet duct into said chamber,

(c) discharging exhaust air from said chamber through a variable air flow control device associated with an exhaust duct communicating with said chamber,




() discharging heated air onto said web within said chamber prior to air discharge through said air flow control device,

(e) determining the rate of application of ink to the said traveling web by sensing the number of flowing ink supplies feeding onto said web and calculating the amount of ink supplied,

(f) and varying the flow of exhaust air in response to the information obtained from said determining step.

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## 4,591,518
## ACRYLIC FUNCTIONAL URETHANE ALKYD RESIN COATING COMPOSITIONS

**William J. Schillinger, Glenshaw; J. Alden Erikson, Gibsonia; Rostyslaw Dowbenko, Gibsonia, and Roger M. Christenson, Gibsonia, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Aug. 13, 1984, Ser. No. 639,874**

**Int. Cl.[4] B05D** *3/02;* **C08G** *63/76;* **C08F** *20/00*

**U.S. Cl. 427—385.5** **21 Claims**

1. A process for coating a substrate with a coating composition comprising the steps of:

(a) applying to a substrate a coating composition containing an ungelled urethane modified alkyd resin containing pendant polymerizable ethylenically unsaturated groups attached to the alkyd resin through urethane linkages, said ungelled urethane-modified alkyd resin being the reaction product of a hydroxyl containing, air oxidizable alkyd resin having an oil length of from about 20 to about 70 percent and an isocyanate-functional ethylenically unsaturated compound and,

(b) curing the coating composition on the coated substrate under ambient or elevated temperature.

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## 4,591,519
## CARGO AIR BAG

**Henry L. Liebel, Cincinnati, Ohio, assignor to Signode Paper Products Company, Cincinnati, Ohio**

**Filed May 16, 1985, Ser. No. 734,669**

**Int. Cl.[4] B61D** *45/00;* **B65D** *81/02*

**U.S. Cl. 428—35** **1 Claim**

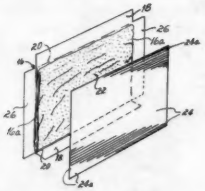
1. An air bag for filling a void in the loading of cargo comprising:

a first sheet of at least two plys of laminated paperboard including a generally planar center section and a pair of side and end sections hinged to said center section along fold lines corresponding to the lengthwise and widthwise edges of said center section, respectively,

a second sheet of at least two plys of laminated paperboard

substantially congruent to said planar center section of said first sheet and facing it, the marginal side edges of said second sheet being interposed between said side and end sections of said first sheet folded thereover in overlapping relation and being adhered thereto, and

an inflatable bladder between said second sheet and the center section of said first sheet,



the overlapping side and end sections of said first sheet capturing therebetween the peripheral side and end portions of said second sheet defining therewith a peripheral border of at least six plys of laminated paperboard in thickness, said air bag being sufficiently stiff that said air bag is substantially self-supporting in said void in the uninflated condition.

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**4,591,520**

## PRESSURE RELIEF DISC

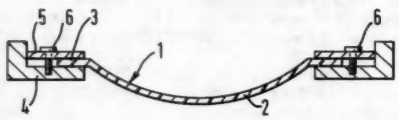
**George W. Brodie, Wellington, England, assignor to IMI Marston Limited, Wolverhampton, England**

**Filed Jan. 4, 1983, Ser. No. 455,020**

**Claims priority, application United Kingdom, Jan. 2, 1982, 8200008**

**Int. Cl.⁴ B32B *1/00, 9/00***

**U.S. Cl. 428—64** **8 Claims**



1. A bursting disc adapted to be mounted in a holder having a domed portion subject to pressure, characterised in that the domed portion is formed of flexible molded exfoliated graphite

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**4,591,521**

## THREE DIMENSIONAL FABRIC DESIGN

**Helen Freno, and John S. Freno, both of 168 Nehring Ave., Staten Island, N.Y. 10314**

**Filed Jul. 1, 1985, Ser. No. 750,738**

**Int. Cl.⁴ B44C *1/18***

**U.S. Cl. 428—78** **6 Claims**

1. A three dimensional fabric design, comprising in combination:

(a) a front fabric panel which is part of a wearing apparel;

(b) a rear fabric panel forming a patch on a rear side of said front fabric panel;

(c) a pocket formed between said panels;

(d) a three dimensionally contoured foam plastic pad contained within said pocket and causing said front fabric panel to conform to its contour, said rear fabric panel being located only behind the pad; and

(e) means for securing said front fabric panel to said rear fabric panel around the perimeter of the pad.

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**4,591,522**

## LIQUID PHOTOPOLYMERS CURABLE TO FIRE-RETARDANT, HYDROLYSIS RESISTANT COMPOSITIONS

**Uan G. Kang; Richard W. Bush, both of Columbia; Arthur D. Ketley, Chevy Chase, and Clifford A. Ferrin, Jr., Baltimore, all of Md., assignors to W. R. Grace & Co., New York, N.Y.**

**Filed Jan. 4, 1985, Ser. No. 688,856**

**Int. Cl.⁴ B05D *3/06***

**U.S. Cl. 428—419** **13 Claims**

1. A photocurable, liquid-at-ambient temperature, hydrolysis resistant and fire-retardant composition consisting of

(1) the reaction product of

(a) an aliphatic unsaturation containing chlorendate, and

(b) a non-ester containing polythiol, said (a) and (b) being reacted non-stoichiometrically;

(2) a member of the group consisting of either (a) or (b) in an amount up to that sufficient to react with the excess of the other in (1) and a liquid acrylate monomer or oligomer, and

(3) at least one photoinitiator.

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**4,591,523**

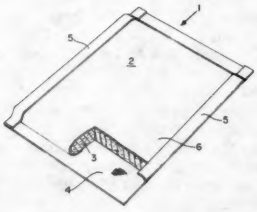
## APERTURED MACROSCOPICALLY EXPANDED THREE-DIMENSIONAL POLYMERIC WEB EXHIBITING BREATHEABILITY AND RESISTANCE TO FLUID TRANSMISSION

**Hugh A. Thompson, Fairfield, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed May 31, 1985, Ser. No. 740,112**

**Int. Cl.⁴ B32B *3/00***

**U.S. Cl. 428—131** **12 Claims**



1. A macroscopically expanded, resilient three-dimensional polymeric web having first and second surfaces located in substantially parallel planes which are remote from one another, said web including a multiplicity of debossments of macroscopic cross-section, each of said macroscopic cross-section debossments originating as an aperture in said first surface of said web and having a continuously interconnected side wall extending in the direction of said second surface of said web, said continuously interconnected side wall terminating to form an end wall located in said second surface of said web, said end wall including a multiplicity of apertures in said second surface of said web, said apertures in said second surface of said web being smaller in size than the corresponding macroscopic aperture in said first surface of said web, said web exhibiting sufficient resistance to compression that said first and said

second surfaces of said web do not become coplanar with one another when said web is subjected to a compressive loading of about one pound per square inch, and a degree of resilience sufficient to return substantially to its undeformed condition when said compressive load is removed from said web.

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## 4,591,524
## CHROMATOGRAPHIC SHEET OF LAYER FOR PRESSURIZED LAYER CHROMATOGRAPHIC APPARATUS

**Erno Tyihák, Zápor u.59. 1032, Budapest; Emil Mincsovics, Vásárhelyi K.tér 4. 2000, Szentendre; József Knoll, Jászai M.tér 4/b 1137, Budapest; Sándor Zoltán, Sárköz u.7/a 1142, Budapest; István Lak, Gellérthegy u.3. 1016, Budapest; Péter Tétényi, Népstadion u.9. 1143, Budapest; Huba Kalász, Hevesi Gy.u.95.1157, Budapest, and János Nagy, Jókai u.2. 2000, Szentendre, all of Hungary**

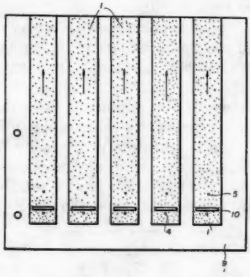
**PCT No. PCT/HU80/00006, § 371 Date Jul. 15, 1981, § 102(e) Date Jul. 15, 1981, PCT Pub. No. WO81/01746, PCT Pub. Date Jun. 25, 1981**

**PCT Filed Dec. 5, 1980, Ser. No. 285,090**

**Claims priority, application Hungary, Jun. 12, 1979, CI 1995**

**Int. Cl.⁴ B32B *3/02, 3/30;* G01N *31/08***

**U.S. Cl. 428—167** **18 Claims**



**1.** A chromatographic sheet for pressurized layer chromatography comprising:

(a) a carrier plate;

(b) an adsorbent layer of material applied to said carrier plate;

(c) at least one place on said chromatographic sheet for the admission of solvent;

(d) at least one place on said chromatographic sheet for the application of sample;

(e) a plurality of barriers for preventing the escape of said solvent from said chromatographic sheet by sealing the adsorbent layer on at least two edges, and further comprising a linear channel-defining structure for ensuring that the front of migration of said solvent is a straight line.

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## 4,591,525
## TRANSPARENT THERMOPLASTIC SHEET

**Michael Cass, Blackburn, England, assignor to Imperial Chemical Industries PLC, London, England**

**Filed Jul. 24, 1984, Ser. No. 633,891**

**Claims priority, application United Kingdom, Aug. 3, 1983, 8320969**

**Int. Cl.⁴ B32B *3/02***

**U.S. Cl. 428—195** **10 Claims**

**1.** A coloured thermoplastic sheet carrying a pattern of opaque dots or lines of surface area equivalent to between 20 and 70% of the area of one surface of the sheet wherein the coloured sheet has chromaticity coordinates (x,y), calculated using Illuminant C as reference, lying within the area of a circle of radius 0.15 scale units drawn with the centre of the circle at coordinates (0.33, 0.33) and a tristimulus value (Y) of between 10 and 70, the chromaticity coordinates and the tristimulus values being calculated according to the 1931 Commission Internationale de l'Eclairage (CIE) Colorimetric System in the absence of the applied pattern whereby when viewed under good illumination from the side of the sheet carrying the opaque dots or lines the sheet can apear opaque and when viewed from the other side of the sheet good vision through the sheet is obtained.

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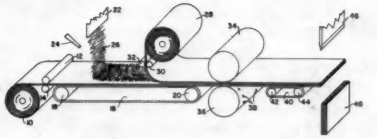
## 4,591,526
## LAMINATED PROTECTIVE JACKET FOR DISC

**Paul Grant, Nabnasset, and Chester Petkiewicz, Lowell, both of Mass., assignors to Pellon Corporation, Lowell, Mass.**

**Division of Ser. No. 313,024, Oct. 19, 1981. This application Aug. 3, 1983, Ser. No. 520,025**

**Int. Cl.⁴ B32B *27/00, 27/14***

**U.S. Cl. 428—198** **5 Claims**



**1.** A laminate comprising (a) a relatively stiff plastic outermost layer, (b) a nonwoven fibrous innermost layer weighing about 20 to 60 grams per square meter, and (c) a fused spun bond fibrous layer intermediate and joined to the innermost and outermost layers, the intermediate layer weighing about 5 to 10 grams per square meter and having a softening temperature lower than that of the innermost layer and outermost layer.

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## 4,591,527
## COMPOSITE FOIL FROM WHICH LAYER AREAS HAVING METALLIC LUSTER ARE TRANSFERRED ONTO A BASE

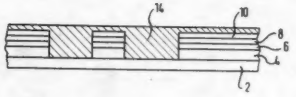
**Eleonore Czichy, Augsburg, Fed. Rep. of Germany, assignor to Interletter AG, Zürich, Switzerland**

**Division of Ser. No. 498,668, May 31, 1983, Pat. No. 4,477,312, which is a division of Ser. No. 281,287, Jul. 7, 1981, abandoned. This application Aug. 15, 1984, Ser. No. 640,932**

**Claims priority, application Fed. Rep. of Germany, Jul. 10, 1980, 3026236**

**Int. Cl.⁴ B32B *3/18;* B41M *3/12***

**U.S. Cl. 428—201** **15 Claims**



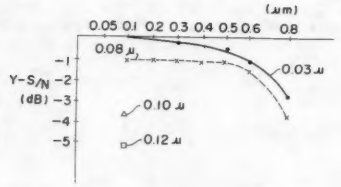
**1.** In a composite foil from which metallically lustrous layer areas which have an image structure are to be transferred onto a base, with a carrier layer, with a lacquer layer on said carrier layer, with a metal layer on said lacquer layer and with an adhesive layer on said metal layer, the improvement which comprises said lacquer layer (**4**) and said metal layer (**8**) being divided into areas which have the shape of the image structure, and wherein said carrier layer (**2**) can be detached from said lacquer layer (**4**) and the adhesive (**14**) which is located between the areas by pulling off said carrier layer at room temperature wherein the metal layer is formed from vapor deposited metal and adhesive (**14**) is a contact adhesive.

4,591,528

## MAGNETIC RECORDING MEDIUM

Masaharu Nishimatsu, Komoro; Toshiaki Ide, Saku; Yuichi Kubota, Komoro; Yoshiaki Saito, and Hiroyuki Arioka, both of Saku, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Aug. 1, 1984, Ser. No. 636,502
Claims priority, application Japan, Aug. 22, 1983, 58-151478
Int. Cl.[4] G11B 5/72
U.S. Cl. 428—212 4 Claims




1. A magnetic recording medium comprising a plastic base film, a magnetic layer formed on one side of the base film and composed of a ferromagnetic alloy powder dispersed in a resin binder, and a backing layer formed on the other side of the base film, characterized in that said ferromagnetic alloy powder has a surface area of at least 48 $m^2/g$ as measured by BET method, said magnetic layer has a coercive force of at least 1,000 Oe and a surface roughness of at most 0.08 μm, and said backing layer is composed essentially of a thermoset or radiation-cured resin and carbon black dispersed in the resin, and has a surface roughness of from 0.05 to 0.6 μm, said carbon black having an average particle size of from 10 to 60 mμm as measured by an electron microscope.

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4,591,529

## SHEET FOR LAMINATED IRON CORES INCLUDING WOVEN OR NON-WOVEN FABRICS

Jürgen Behringer; Hans-Friedrich Pluciniczak; Wolfgang Syllwasschy, all of Bochum, Fed. Rep. of Germany, and Franz Loley, Vienna, Austria, assignors to Stahlwerke Bochum AG, Bochum, Fed. Rep. of Germany

Filed Sep. 13, 1984, Ser. No. 650,385
Claims priority, application Fed. Rep. of Germany, Sep. 14, 1983, 3333155
Int. Cl.[4] B32B 7/00, 15/00
U.S. Cl. 428—252 8 Claims

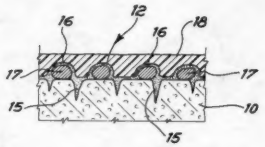
1. In a sheet, especially an electric sheet for manufacturing laiminated iron cores for generators, motors, transformers, etc. and covered on one or both sides with a thin layer consisting of a two-stage hardening metal adhesive applied as a liquid to the sheet and then preliminarily dried at low temperatures and hardened under pressure at higher temperatures in the range from 130°–250° C., the improvement wherein the sheet has a filler on one or both sides comprising reticular skeletal support including a fibrous woven or non-woven fabric which accommodates the adhesive as a liquid and that is at least partly anchored with said thin layer of said preliminarily dried adhesive.

4,591,530

## SOFT CERAMIC KITCHENWARE INTERNALLY COATED WITH A NON-STICK RESIN

Umberto Lui, Fano, Italy, assignor to T.V.S. S.p.A., Trasanni Urbino, Italy

Filed Apr. 19, 1984, Ser. No. 602,172
Claims priority, application Italy, May 3, 1983, 20902 A/83
Int. Cl.[4] B32B 18/00, 27/00, 15/04
U.S. Cl. 428—325 8 Claims




1. Soft ceramic kitchenware consisting of a ceramic material having pores, a coating of a non-stick resin on the food contacting surface and an intermediate bonding layer consisting of a lead-free frit, said frit having a melting point between 500° and 950° C., said frit consisting of:

(a) A glaze of melting point essentially between 500° and 950° C., said glaze penetrating and anchoring to the pores of said material, thus eliminating the air present in the pores,

(b) a substance which does not melt at the melting temperature of the glaze or which solidifies substantially immediately when the temperature drops below said melting temperature of the glaze, said substance constituting more than 15% and less than 50% of said frit, said substance forming hard grains dispersed in the glaze.

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4,591,531

## HOT-MELT ADHESIVE FOR THERMAL INSULATING ARTICLES

William E. Uffner, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Aug. 12, 1982, Ser. No. 407,393
Int. Cl.[4] B32B 11/00
U.S. Cl. 428—468 5 Claims

1. In an article comprising thermal insulation and a flexible jacket material having a metallic foil directly adhered to said insulation by a hot melt adhesive, the improvement wherein said adhesive is free from polypropylene and consists essentially of about 43–75% by weight of asphaltene-enriched asphalt, said asphalt including in excess of about 40% asphaltene, less than about 27% resin and less than about 33% oil; from about 22–38% by weight of an ethylene-vinyl acetate copolymer and a compatible amount in the range of 12–31% by weight of an oxidized micro-crystalline petroleum wax.

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4,591,532

## FLOORING

Yoshiharu Tanaka, Akashi, Japan, assignor to Bando Chemical Industries, Ltd., Hyogo, Japan

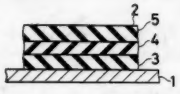
Filed Sep. 13, 1985, Ser. No. 776,147
Claims priority, application Japan, Sep. 25, 1984, 59-200200
Int. Cl.[4] B32B 25/12
U.S. Cl. 428—493 3 Claims

1. A flooring to be used for vehicles and vessels, comprising:

(a) a lowermost rubber layer which makes direct contact with a floor board for a vehicle and is formed with a rubber compound containing a hydrate which discharges water of crystallization at the temperature of 150°–300° C.

(b) a surface layer, and

(c) an intermediate layer which controls heat conduction from the lowermost layer to the surface layer,
said three layers being laminated into one by bonding.




3. A flooring as defined in claim 1, wherein the intermediate layer is formed with at least one sheet of cotton canvas.

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**4,591,533**

## COATING COMPOSITION OF AN ACRYLIC POLYMER, A DISPERSED ACRYLIC POLYMER AND AN ALKYLATED MELAMINE CROSSLINKING AGENT

**Joseph A. Antonelli, Riverton, and Isidor Hazan, Clementon, both of N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jun. 3, 1985, Ser. No. 740,895**
**Int. Cl.[4] B32B *27/08*; C08L *61/28***
**U.S. Cl. 428—520** **17 Claims**

1. A coating composition comprising about 20–85% by weight of film forming binder and 15–80% by weight of an organic liquid carrier:

(a) an acrylic polymer I consisting essentially of polymerized monomers of alkyl methacrylate, alkyl acrylate and hydroxy alkyl acrylate or methacrylate and having a weight average molecular weight of about 3,000 to 20,000;

(b) a self stabilized dispersed resin formed by polymerizing in solution the following constituents:

(1) an acrylic polymer II consisting essentially of polymerized monomers comprising alkyl methacrylate, alkyl acrylate, hydroxy alkyl acrylate or methacrylate, an ethylenically unsaturated carboxylic acid and having a weight average molecular weight of 3,000 to 20,000.

(2) monomers comprising alkyl methacrylate, alkyl acrylate and hydroxy alkyl acrylate or methacrylate; wherein either acrylic polymer II contains glycidyl methacrylate or acrylate monomers post reacted with the carboxylic acid or the monomers contain glycidyl methacrylate or acrylate;

(c) an alkylated melamine formaldehyde crosslinking agent; wherein the molecular weight of each of the polymers is determined by gel permeation chromatography using polymethyl methacrylate as the standard.

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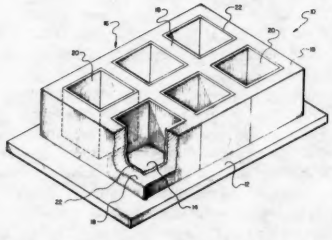
**4,591,534**

## WALL STRUCTURE FOR ROCKET NOZZLE EXTENSION

**William R. Wagner, Los Angeles, and Robert A. Feight, Canoga Park, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Filed Aug. 23, 1984, Ser. No. 643,608**
**Int. Cl.[4] B64D *33/04***
**U.S. Cl. 428—593** **9 Claims**



1. A rocket-engine nozzle extension having an improved wall structure of increased structural strength and thermal radiation capability, said wall structure comprising:

a base of sheet metal;

a plating on one surface of said base, said plating being formed of a material having good thermal conductivity and a high melting point so as to improve the radiation capability of said surface;

a rib wall comprising intersecting ribs forming a grid structure having internal cavities, said rib wall being set upon and bonded to the plated surface of said base so that each cavity is open at one end; and

a plating on the internal surfaces of the ribs which form each cavity, said plating being formed of a material having good thermal conductivity, a high melting point, and a good radiation emissivity characteristic so that the rib wall provides increased structural strength and stiffness for the wall structure and said plating provides excellent thermal radiation, thereby permitting said nozzle extension to operate at lower temperatures.

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**4,591,535**

## METHOD OF BRAZING CERAMICS USING ACTIVE BRAZING ALLOYS

**Howard Mizuhara, Hillsborough, Calif., assignor to GTE Products Corporation, Stamford, Conn.**

**Filed Jun. 20, 1984, Ser. No. 622,362**
**Int. Cl.[4] C22C *9/00***
**U.S. Cl. 428—627** **5 Claims**

1. An article consisting essentially of:

(a) a ceramic substrate selected from the group consisting of aluminum oxide, silicon nitride, silicon carbide, and partially stabilized zirconia,

(b) a member selected from the group consisting of metals and ceramics and,

(c) a brazed joint bonding said member and said substrate, said braze being selected from the group consisting essentially of, in per cent by weight, (1) from about 25% to about 29% Cu, from about 1% to about 3% Ti and the balance Ag, (2) from about 22% to about 26% Cu, from about 9% to about 16% In, from about 1% to about 3% Ti and the balance Ag, (3) from about 16% to about 20% Ni, from about 1% to about 3% Ti and the balance Au, and (4) from about 2% to about 5% Zr and the balance Cu.

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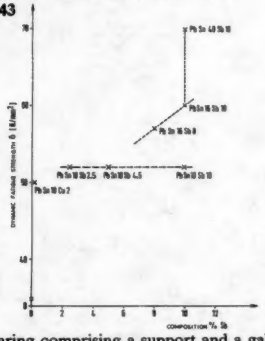
**4,591,536**

## PLAIN BEARING AND METHOD OF MANUFACTURE

**Erich Hodes, Rosbach; Peter Lippok, Wiesbaden, and Bernd Miotk, Essenheim, all of Fed. Rep. of Germany, assignors to Glyco Metall-Werke Daelen & Hofmann KG, Wiesbaden, Fed. Rep. of Germany**

**Filed Oct. 1, 1984, Ser. No. 656,437**
**Claims priority, application Fed. Rep. of Germany, Oct. 1, 1983, 3335716**
**Int. Cl.[4] B32B *15/04*; C22C *11/06***
**U.S. Cl. 428—643** **9 Claims**



1. A plain bearing comprising a support and a galvanically deposited bearing alloy deposited on said support in a thickness of about 0.01 to 0.1 mm, said bearing alloy being copper-free alloy of only tin, antimony and lead and consisting essentially

of 16 to 40% by weight tin, 8 to 11% by weight antimony and the balance lead.

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**4,591,537**

## COMBINATION OF ALN-$Y_2O_3$ HEAT CONDUCTIVE CERAMIC SUBSTRATE AND ELECTRONIC COMPONENT

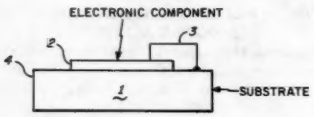
**Fritz Aldinger, Rodenbach; Richard Keilberth, Kleinheubach, and Waltraud Werdecker, Hanau, all of Fed. Rep. of Germany, assignors to W. C. Heraeus GmbH, Hanau, Fed. Rep. of Germany**

**Continuation of Ser. No. 563,026, Dec. 19, 1983, abandoned. This application Jun. 5, 1985, Ser. No. 741,711**

**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1982, 3247985**

**Int. Cl.[4] B32B** *9/00;* **C04B** *35/58*

**U.S. Cl. 428—698** **9 Claims**




1. The combination of

a heat conductive ceramic substrate and an electronic component, comprising

a sheet of non-toxic, high density, polycrystalline substrate material (1) consisting of

aluminum nitride and an additive consisting of yttrium oxide, being present in between 0.1 to 5% (by weight);

and wherein an electronic component (2) is provided, secured in heat conductive contact with the substrate, and electrical connection means (3, 4) are provided, attached to said component, the heat conductive ceramic substrate conducting heat away, generated in operation of the electronic component (2) secured in heat conductive contact with the substrate.

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**4,591,538**

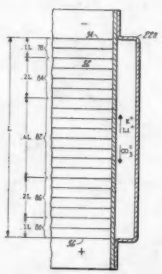
## BINARY ELECTROLYTE FOR MOLTEN CARBONATE FUEL CELLS

**Harold R. Kunz, Vernon, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Dec. 3, 1984, Ser. No. 677,625**

**Int. Cl.[4] H01M** *8/14*

**U.S. Cl. 429—16** **8 Claims**



1. A molten carbonate electrolyte consisting essentially of approximately 72 m % $Li_2CO_3$ and 28 m % $K_2CO_3$ which displays a uniform lithium to potassium molar ratio under operative conditions along the length of a fuel cell stack having a plurality of fuel cells disposed adjacent to each other which are in ion communication and which are subjected to a voltage gradient.

4. A fuel cell having an electrolyte matrix containing a binary alkali metal carbonate electrolyte which is molten during operation of the fuel cell, an anode electrode in contact with the electrolyte matrix and a cathode electrode in contact with the electrolyte matrix, wherein the improvement comprises utilizing as the electrolyte an electrolyte having a steady state composition which consists essentially of 70 to 73 m % $Li_2CO_3$ and 27 to 30 m % $K_2CO_3$.

7. A method for establishing a steady state electrolyte composition for a molten carbonate fuel cell employing a binary $Li_2CO_3$-$K_2CO_3$ electrolyte comprising:

determining a first amount of lithium which will react to form stable compounds during operation of the fuel cell and change the molar ratio of the binary electrolyte before steady state composition is reached;

disposing a molten carbonate electrolyte in the fuel cell which consists essentially of a mixture of (i) an amount of $Li_2CO_3$ which contains the first amount of lithium and (ii) a second amount of 70 to 73 m % $Li_2CO_3$ and 27 to 30 m % $K_2CO_3$ such that after operation for two thousand hours the molten carbonate electrolyte consists essentially of 70 to 73 m % $Li_2CO_3$ and 27 to 30 m % $K_2CO_3$.

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**4,591,539**

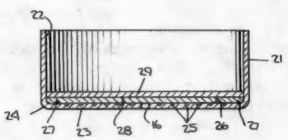
## METAL-AIR CATHODE BUTTON CELL

**John E. Oltman, Mt. Horeb; Denis D. Carpenter, and Robert B. Dopp, both of Madison, all of Wis., assignors to Rayovac Corporation, Madison, Wis.**

**Continuation of Ser. No. 506,990, Jun. 23, 1983, abandoned. This application Mar. 21, 1985, Ser. No. 714,628**

**Int. Cl.[4] H01M** *12/06*

**U.S. Cl. 429—27** **18 Claims**




1. In a button cell having air cathode assembly, a metallic anode and an electrolyte, said air cathode assembly, anode and electrolyte being housed in a cell assembly comprising an anode can, the open end thereof extending into a cathode can with a grommet compressed therebetween and wherein, when assembled, said cathode can includes at least one port in the bottom thereof communicating with the exterior of the cell, the improvement comprises:

(a) a plurality of grooves in at least one of:

(1) the interior bottom face of said cathode

(2) the face of said cathode assembly abutting said interior bottom face of said cathode in the vicinity of said at least one port

to thereby define gas diffusion passages communicating with said port and said cathode assembly at a plurality of loci remote from said port, said grooves, terminating at a perimeter within the perimeters of both said cathode assembly and said interior bottom face of said cathode can to thereby provide abutting, ungrooved peripheries; and

(b) an additional volume within said button cell, created by compressing said air cathode assembly and said cathode can together in a sealing configuration at said abutting ungrooved peripheries.

4,591,540

## METHOD OF TRANSFERRING A PATTERN INTO A RADIATION-SENSITIVE LAYER

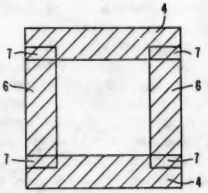
Harald Bohlen, Ammerbuch, Fed. Rep. of Germany; Erwin Bretscher, Rapperswil, Switzerland; Helmut Engelke, Altdorf; Peter Nehmiz, Stuttgart, both of Fed. Rep. of Germany; Peter Vettiger, Langnau, Switzerland, and Johann Greschner, Pliezhausen, Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 23, 1984, Ser. No. 603,020

Claims priority, application European Pat. Off., May 23, 1983, 83105177.6

Int. Cl.[4] G03F *9/00*; G03C *5/00*

U.S. Cl. 430—22 11 Claims




1. Method of transferring a pattern to a radiation-sensitive layer on substrates, where two partial masking patterns which, when superimposed upon each other in a predetermined alignment, yield the complete pattern, with elements of both partial patterns combining to form elements of the complete pattern and these partial pattern elements overlapping sectionally, aligned relative to each other and to the substrate in the predetermined manner, are projected with a suitable radiation to the radiation-sensitive layer, with the complete pattern being latently formed in the radiation-sensitive layer, and where the radiation-sensitive layer is then developed, characterized in that designing of the two partial masking patterns comprises

producing a complete pattern of elements of the desired pattern to be transferred,

producing a reduced size image of the complete pattern by exposure of the complete pattern to negative windage to thereby reduce the size of the elements of the pattern by a predetermined amount,

partitioning the resultant complete pattern reduced in size by negative windage into two negative windage partial patterns,

producing two expanded partial masking patterns by exposing the partial patterns to positive windage to thereby increase the size of the elements in the partial patterns by a predetermined amount to compensate for the amount reduced by negative windage;

said expanded partial patterns collectively used for exposing a radiation sensitive layer to define said desired pattern.

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4,591,541

## PROCESS FOR THE PREVENTION OF THE MEMORY EFFECT IN AN ORGANIC PHOTOCONDUCTOR LAYER IN AN ELECTROPHOTOGRAPHIC PROCESS

Toru Nakazawa, Sennan, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

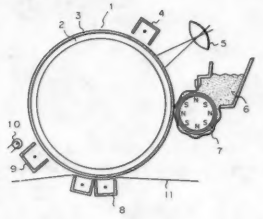
Filed Jun. 28, 1984, Ser. No. 625,535

Claims priority, application Japan, Jun. 30, 1983, 58-117091

Int. Cl.[4] G03G *13/16*

U.S. Cl. 430—59 5 Claims

1. In an electrophotographic process including providing an organic photoconductive photosensitive layer capable of being charged at both positive and negative polarities, performing main charging of said layer by direct current corona discharge, imagewise exposing the thus charged layer to form an electrostatic image, developing said electrostatic image with a magnetic brush of toner at a polarity opposite to that of said main charging to thereby form a toner image on said layer, bringing a copy sheet into contact with said layer having thereon said toner image, transferring said toner image to said copy sheet by applying to the back of said copy sheet direct current discharge of the same polarity as that of said main charging, and removing from said layer residual toner remaining after said transferring by contacting said layer with said magnetic brush, the improvement comprising:




applying the current of said direct current discharge to perform said transferring at a level 23 to 35 times the current to initiate transfer of said toner; and

after said transferring of said toner image and before said removing said residual toner, subjecting said layer to direct current corona discharge of a polarity opposite to that of said main charging and thereby charging said residual toner at a uniform polarity.

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4,591,542

## LIGHT-SENSITIVE MEMBER AND PREPARATION THEREOF FOR USE IN ELECTROPHOTOGRAPHY

Yoshihide Fujimaki; Koichi Kudo; Yoshiaki Takei, and Hiroyuki Nomori, all of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed May 21, 1984, Ser. No. 612,373

Claims priority, application Japan, May 26, 1983, 58-93053

Int. Cl.[4] G03G *5/14*

U.S. Cl. 430—59 22 Claims

1. A light-sensitive member having a charge generating phase formed by coating a dispersion comprising a solvent and a charge generating substance having an electron attracting group dispersed therein, which contains in said charge generating phase an amine as a material which increases light sensitivity in an amount of 20-fold moles or less per mole of said charge generating substance and 1/60 or less by volume of said solvent.

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4,591,543

## METHOD OF PURGING EXCESS OF LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC APPARATUS

Shuichi Outsuka, and Akinori Kimura, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 5, 1985, Ser. No. 762,611

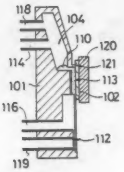
Claims priority, application Japan, Aug. 7, 1984, 59-164241

Int. Cl.[4] G03G *13/10*

U.S. Cl. 430—125 4 Claims

1. A method of purging an excess of a liquid developer in an electrophotographic apparatus, comprising the steps of pressing an electrophotosensitive film formed with an electrostatic latent image against an opening of a developing chamber to close the opening, supplying the liquid developer into said developing chamber to toner-develop said electrostatic latent image, discharging said liquid developer, and supplying gas under pressure into said developing chamber to purge said liquid developer remaining in said developing chamber as well as excess of said liquid developer attaching to said electropho-

tosensitive film, said method further comprising the step of changing the flow rate of said gas supplied into said developing




chamber and flowing along the surface of said electrophotosensitive film during the process of development.

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**4,591,544**

## METAL IMAGE FORMING MATERIALS WITH LIGHT SENSITIVE RESIN LAYER AND OBLIQUE ANGLE DEPOSITED METAL UNDERLAYER

**Nobumasa Sasa, Hino; Yuzuru Sato, Hachioji; Tatsuo Ohta, Sagamihara, and Masanari Shindo, Hachioji, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 436,644, Oct. 25, 1982, abandoned. This application Jan. 2, 1985, Ser. No. 688,743**

**Claims priority, application Japan, Nov. 2, 1981, 56-174417; Nov. 2, 1981, 56-174418; Nov. 2, 1981, 56-174419; Nov. 4, 1981, 56-175800**

**Int. Cl.[4] C23C *16/44*; G03C *1/74, 1/94*; G03F *7/16***

**U.S. Cl. 430—166** **30 Claims**

1. A metal image forming material comprising in sequence
(a) a support,
(b) a subbing layer on said support,
(c) at least one metal layer on said subbing layer, and
(d) a light-sensitive resin layer provided on the metal layer furthest from said support, wherein said subbing layer is soluble in or has an affinity for an aqueous processing solution, said metal layer being prepared by vapor deposition of a metal and said metal layer furthest from said support being deposited by a vapor directed at said support at an angle of at least 45° to a line normal to said support.

12. A metal image forming material comprising in sequence
(a) a support,
(b) at least two metal layers on said support, and
(c) a light-sensitive resin layer provided on the metal layer furthest from said support,
wherein said metal layers are prepared by vapor deposition, said metal layer furthest from said support being deposited by a vapor directed at said support at an angle of at least 45° to a line normal to said support, the other metal layers being deposited at an angle relative to the normal of said support which is less than the angle of deposition of said metal layer furthest from said support.

19. A metal image forming material comprising a support, a metal layer formed thereon by the deposition of the vapor of a metal deposited thereon at an angle, said angle being greater than 30° but less than 45° from the normal to the support during the initial deposition, and increasing at least 10° at final deposition to an angle of greater than 45°, and a light-sensitive resin layer covering said deposited metal layer.

26. A method for the production of a metal image forming material comprising the steps of forming at least one metal layer on a support by depositing the vapor of a metal thereon at an angle of at least 45° from a line normal to said support and applying a light-sensitive resin layer over said metal layer.

**4,591,545**

## PHOTOSENSITIVE IMAGE-FORMING MATERIAL HAVING A LAYER OF PHOTOSENSITIVE POLYESTER MODIFIED WITH CHAIN EXTENDER

**Chiaki Nakamura, Tokyo; Kouji Oe; Tomonobu Muta, both of Urawa, and Toshiki Sasaki, Kamifukuoka, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan**

**Filed Jan. 27, 1984, Ser. No. 574,573**

**Claims priority, application Japan, May 10, 1983, 58-81282; Aug. 4, 1983, 58-142782; Sep. 8, 1983, 58-164149; Oct. 21, 1983, 58-196137**

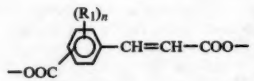
**Int. Cl.[4] G03C *1/70, 1/68*; C08G *18/06***

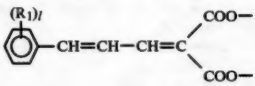
**U.S. Cl. 430—284** **14 Claims**

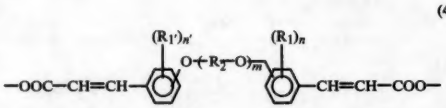
1. A photosensitive image-forming material having a photosensitive layer, said photosensitive layer comprising a photosensitive resin which is the reaction product of a hydroxyl-containing polyester precursor composed of dicarboxylic acid units derived from a dicarboxylic acid having a photosensitive unsaturated double bond adjacent to an aromatic ring and glycol units with a chain extender having in the molecule at least two functional groups reactive with the hydroxyl groups of the polyester precursor, said photosensitive resin having a weight average molecular weight of at least 40,000.

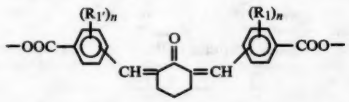
2. The image-forming material of claim 1 wherein the dicarboxylic acid units derived from a dicarboxylic acid having a photosensitive unsaturated double bond adjacent to an aromatic ring are represented by any of the following general formulae (1) to (7):

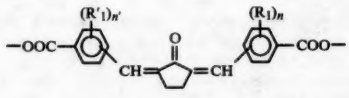


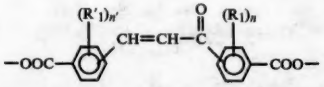




wherein $R_1$ and $R'_1$, independently from each other, represent a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms, a halogen atom or a nitro group, $R_2$ represents an alkylene group having 2 to 4 carbon atoms, l represents an integer of 1 to 5, n represents an integer of 1 to 4, and m represents an integer of 1 to 5.

3. The image-forming material of claim 1 or 2 wherein the chain extender contains as the functional groups capable of reacting with the hydroxyl groups of the polyester precursor at least one kind of functional groups selected from the class consisting of aryl ester, aryl carbonate, N-acyllactam, N-acylimide, acid anhydride, benzoxazinone, isocyanate, blocking isocyanate, oxazolonyl, N-acylimidazole, silanol, furoxane, aziridine, isothiocyanate, vinyl ether, ketene acetal, unsaturated cycloacetal and carbodiimide groups.

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## 4,591,546

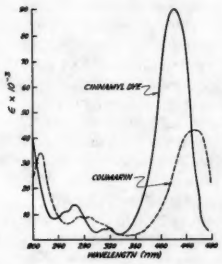
## SPIN CASTABLE RESIST COMPOSITION AND USE

**Paul R. West, Clifton Park, and Bruce F. Griffing, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Division of Ser. No. 619,526, Jun. 11, 1984, Pat. No. 4,535,053. This application May 13, 1985, Ser. No. 733,168**

**Int. Cl.[4] G03C *1/495***

**U.S. Cl. 430—270** **2 Claims**

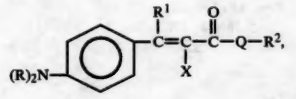



1. A spin castable photoresist composition comprising

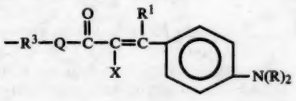
(A) 100 parts of an inert organic solvent

(B) 1 to 15 parts of a polymethylmethacrylate and

(C) 0.01 to 1.0 part of a cinnamic acid derivative of the formula



where R and $R^1$ are selected from hydrogen or $C_{(1-8)}$ alkyl, Q is —O— or —N—, X is selected from halogen and nitrile, $R^2$ is a monovalent group selected from



polyalkylene glycol, polyalkylene amide and polyalkylene ester and $R^3$ is a $C_{(1-8)}$ alkylene radical or $C_{(6-13)}$ aryl

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## 4,591,547

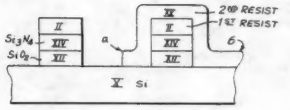
## DUAL LAYER POSITIVE PHOTORESIST PROCESS AND DEVICES

**Terry Brownell, East Setauket, N.Y., assignor to General Instrument Corporation, New York, N.Y.**

**Continuation of Ser. No. 436,774, Oct. 20, 1982, abandoned. This application Jun. 8, 1984, Ser. No. 618,529**

**Int. Cl.[4] G03C *5/00***

**U.S. Cl. 430—312** **6 Claims**




1. A method of fabricating a semi-conductor device comprising the steps of:

(a) forming a first layer of positive photoresist on a substrate surface;

(b) exposing selected portions of said photoresist layer;

(c) developing said layer to remove those portions which were exposed, and leaving those other portions which were not exposed;

(d) plasma etching said substrate and said unexposed resist so that the plasma etch fixes said unexposed photoresist;

(e) forming a second layer of photoresist over said fixed first layer and said etched substrate; and

(f) exposing and developing selected portions of said second layer of photoresist being non-congruent with said unexposed fixed left first photoresist;

thereby forming a double photoresist layer where said second layer is over said fixed first layer; and wherein in step (b) said photoresist is fully exposed; and

wherein said photoresist is overexposed to avoid spewing of said photoresist during step (f).

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## 4,591,548

## CYAN DYE-FORMING COUPLERS AND PHOTOGRAPHIC ELEMENTS AND PROCESSES

**Ivano Delprato, Savona, Italy, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Jul. 15, 1985, Ser. No. 755,266**

**Claims priority, application Italy, Jul. 20, 1984, 21992 A/84**

**Int. Cl.[4] G03C *1/40, 7/34***

**U.S. Cl. 430—389** **7 Claims**

1. A process for forming a cyan dye image in a photographic element comprising a support and a silver halide emulsion, characterized by the step of developing the exposed element with a silver halide color developing agent in the presence of a 2-equivalent cyan dye-forming 6-hydroxy-2H-1,4-benzoxazin-3-(4H)-one coupler.

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## 4,591,549

## PROCESS FOR PREPARING SILVER HALIDE EMULSIONS

**Syoji Matsuzaka, Hino; Makoto Kajiwara; Masanobu Miyoshi, both of Odawara, and Kiyoshi Yamashita, Hino, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 528,129, Aug. 31, 1983, abandoned. This application Sep. 14, 1984, Ser. No. 651,067**

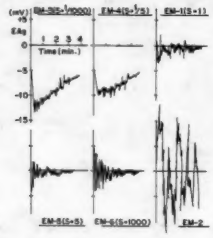
**Claims priority, application Japan, Sep. 8, 1982, 57-157170**

**Int. Cl.[4] G03C *1/02***

**U.S. Cl. 430—569** **14 Claims**

1. In a process for preparing a silver halide emulsion comprising a mole % of silver bromide, b mole % of silver chloride and c mole % of silver iodide, where $a>0$, $b>0$, $c\geq 0$ and $a+b+c=100$, wherein a silver ion first solution and a halide ion first solution are mixed in the presence of a protective colloid according to a double jet method, the improvement

wherein a molar ratio of bromide ion: chloride ion: iodide ion in said second solution is a:kb:c, where $1 \geqq k \geqq 0.9$, and said process further includes a step to produce silver halide emulsion, while controlling the concentration of the halide ions in the system obtained by mixing said first and second solutions at




$3 \times 10^{-2}$ normal through $1 \times 10^{-6}$ normal by using a third solution containing chloride ions and bromide ions at a molar ratio Y ($Cl^-/Br^-$) defined by the following formula:

$$Y = KX$$

wherein K is 40 to 1200 and X is b/a.

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**4,591,550**

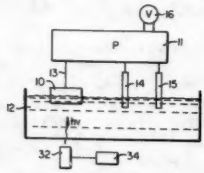
## DEVICE HAVING PHOTORESPONSIVE ELECTRODE FOR DETERMINING ANALYTES INCLUDING LIGANDS AND ANTIBODIES

**Dean Hafeman, San Bruno, Calif.; John W. Parce, Winston-Salem, N.C., and Harden M. McConnell, Stanford, Calif., assignors to Molecular Devices Corporation, Palo Alto, Calif.**

**Continuation-in-part of Ser. No. 585,334, Mar. 1, 1984, abandoned. This application Apr. 5, 1984, Ser. No. 597,135**

**Int. Cl.⁴ G01N** *21/27, 27/07, 33/50, 33/53*

**U.S. Cl. 435—4** **38 Claims**




1. A photoresponsive device for making at different sites a plurality of determinations of a substance capable of modulating an electrical signal resulting from irradiation of a photoresponsive element, said device comprising:

a photoresponsive element having an irradiation receiving surface;

irradiation means for irradiating at least two sites on said irradiation receiving surface to provide distinguishable signals;

means for polarizing said photoresponsive element, said polarizing means connected to said photoresponsive element; and

means for retaining media in which said substance is to be determined in photoresponsive modulating relationship to at least two sites; and

means for measuring the potential of said polarizing means during irradiation of a site.

**4,591,551**

## RADIOENZYMATIC METHOD FOR ASSAYING NORMETANEPHRINE AND OCTOPAMINE

**Vincent DeQuattro, Pasadena, Calif., and Kiyoshi Kobayashi, Sendai, Japan, assignors to University of Southern California, Los Angeles, Calif.**

**Continuation of Ser. No. 282,464, Jul. 13, 1981, which is a continuation-in-part of Ser. No. 122,623, Feb. 19, 1980. This application May 22, 1984, Ser. No. 612,840**

**Int. Cl.⁴ C12Q** *1/48;* **C12N** *9/10*

**U.S. Cl. 435—15** **12 Claims**

1. In a method for assaying a phenylethanolamine selected from normetanephrine and octopamine in a sample, in which method said phenylethanolamine is enzymatically transmethylated in an incubation mixture of said phenylethanolamine, a compound containing a transferable tritiated methyl group and a transfer enzyme, to form a tritiated N-methyl derivative, and the radioactivity of the derivative is measured, the improvement according to which incubation of said mixture is conducted at a pH in the range of 8.8–9.3.

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**4,591,552**

## DETECTION OF HEPATITIS B SURFACE ANTIGEN (OR ANTIBODY TO SAME) WITH LABELED SYNTHETIC PEPTIDE

**A. Robert Neurath, New York, N.Y., assignor to New York Blood Center, Inc., New York, N.Y.**

**Filed Sep. 29, 1982, Ser. No. 426,309**

**Int. Cl.⁴ G01N** *53/00*

**U.S. Cl. 435—7** **8 Claims**

1. A process for the detection of antibodies to Hepatitis B in a sample which comprises:

a. contacting said sample with a solid substrate coated with an unlabeled synthetic peptide comprising the following sequence of amino acids: Pro Ser Cys Cys Cys Thr Lys Pro Thr or Ser Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser, which peptide is recognized by and bound by the antibodies suspected of being present in said sample, incubating and washing said contacted sample,

b. contacting the incubated, washed mass obtained from step a. above with a radiolabeled or enzyme labeled antibody to human or animal immunoglobulin, incubating and washing the contacted sample, and

c. determining the radioactivity or enzymatic activity of the resultant mass of step b. above.

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**4,591,553**

## PROCESS AND ANALYTICAL AGENT FOR THE DETERMINATION OF THE ACTIVITY OF GLUTAMATE-OXALACETATE-TRANSAMINASE

**Ulfert Deneke, Mörlenbach; Wolfgang Gruber, Tutzing-Unterzeismering, and Hans-Georg Batz, Tutzing, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany**

**Filed Jun. 1, 1983, Ser. No. 500,111**

**Claims priority, application Fed. Rep. of Germany, Jun. 9, 1982, 3221730**

**Int. Cl.⁴ C12Q** *1/52*

**U.S. Cl. 435—16** **12 Claims**

1. A process for the determination of the activity of glutamate-oxalacetate-transaminase (GOT) in an aqueous solution sample comprising

(a) reacting alpha-ketoglutarate with alanine-sulphinic acid, catalysed by GOT, to give pyruvate, sulphur dioxide and glutamate,

(b) reacting the resultant pyruvate with phosphate and oxygen, catalyzed by pyruvate oxidase, to give acetyl phosphate, carbon dioxide and hydrogen peroxide,

(c) reacting the hydrogen peroxide formed, and a chromogen selected from the group consisting of N-(3'-sulphonyl-4'-hydroxy-5'-chlorophenyl)-4-aminoantipyrine (SHYC-AA) and 4,5-bis-[4-dimethylaminophenyl]-2-[3,5-dime-

thoxy-4-hydroxyphenyl]-imidazole (B-DDH-imidazole), catalysed by a peroxidase, to give a dyestuff and water and
(d) determining the amount of dyestuff formed as a measure of the activity of GOT in the sample.

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4,591,554

## RAPID METHOD FOR DETECTING MICROORGANISMS

Ichiro Koumura, Sagamihara; Hideo Kanou, Yokosuka; Masahiko Okunishi, Tokyo, and Kazuhiko Yamada, Fujisawa, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Continuation of Ser. No. 250,737, Apr. 3, 1981, abandoned. This application Sep. 16, 1983, Ser. No. 521,460
Claims priority, application Japan, Oct. 31, 1979, 54-140582
Int. Cl.[4] C12Q *1/34, 1/04, 1/06, 1/10*
U.S. Cl. 435—18 11 Claims

1. A method for rapidly determining a small number of microorganisms, less than $10^4$ per 1 milliliter, in a sample, which comprises:
(A) forming a nutrient-containing solution consisting essentially of a nutrient medium capable of supporting propagation of the microorganisms and an aqueous solvent;
(B) mixing said solution with a non-fluorescent umbelliferone derivative;
(C) introducing said sample which contains microorganisms into said solution;
(D) allowing said microorganisms to propagate in said solution consisting essentially of said nutrient-containing solution, umbelliferone derivative and sample for 1 to 12 hours;
(E) measuring the amount of fluorescent umbelliferone derivative liberated by action of propagated microorganisms with a fluorescence detector; and
(F) determining the number of microorganisms less than $10^4$ per 1 milliliter of said sample based on the amount of liberated fluorescent umbelliferone derivative.

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4,591,555

## MALATE DEHYDROGENASE METHOD

Larry H. Bernstein, 1725 Campus Dr., Binghamton, N.Y. 13903

Continuation-in-part of Ser. No. 431,028, Sep. 30, 1982, Pat. No. 4,543,327, which is a continuation-in-part of Ser. No. 340,132, Jan. 18, 1982, abandoned, which is a continuation of Ser. No. 158,121, Jun. 10, 1980, Pat. No. 4,311,791. This application Apr. 27, 1983, Ser. No. 488,693
The portion of the term of this patent subsequent to Sep. 24, 2002, has been disclaimed.
Int. Cl.[4] C12Q *1/32;* C12N *9/99*
U.S. Cl. 435—26 6 Claims

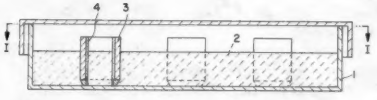
1. A method of diagnosing the presence of neoplastic cells in a malignant growth comprising:
(a) providing a fluid from said malignant growth,
said fluid containing cytoplasmic malate dehydrogenase,
(b) determining whether said fluid comprises aberrant malate dehydrogenase,
said determining comprising a reaction using said cytoplasmic malate dehydrogenase whereby the presence of aberrant malate dehydrogenase indicates the presence of neoplastic cells in said malignant growth.

4,591,556

## APPARATUS AND ASSOCIATED METHODS FOR USE IN MICROBIOLOGICAL, SEROLOGICAL, IMMUNOLOGICAL, CLINICAL-CHEMICAL AND SIMILAR LABORATORY WORK

Rolf Saxholm, Box 3, 1362 Billingstad, Norway

Continuation of Ser. No. 12,905, Feb. 16, 1979, Pat. No. 4,324,859, which is a continuation-in-part of Ser. No. 731,103, Oct. 8, 1976, Pat. No. 4,140,582, which is a continuation of Ser. No. 602,745, Aug. 7, 1975, Pat. No. 3,985,608, which is a continuation of Ser. No. 414,939, Nov. 12, 1973, abandoned, which is a division of Ser. No. 33,594, May 1, 1970, Pat. No. 3,791,930. This application Apr. 5, 1982, Ser. No. 365,239
Claims priority, application Norway, May 3, 1969, 1832/69
The portion of the term of this patent subsequent to Aug. 3, 1999, has been disclaimed.
Int. Cl.[4] C12Q *1/20*
U.S. Cl. 435—33 63 Claims




1. Apparatus for carrying out biological and chemical tests in microbiological, serological, immunological, and clinical-chemical work comprising: a carrying body including a wall which is shaped to confine a substantially closed area on one side thereof, said body being elongated along an axis, means comprising an active substance held on said wall in a position facing into said closed area for diffusing said active substance from said body into the closed area, and a substrate containing an agent confined within said closed area and in which said means is immersed such that said active substance is diffused into the substrate along the depth of immersion therein for producing a substantial equilibrium concentration of the active substance in said confined area, said active substance being held on said wall in relation to said axis of said body such that the diffusion of active substrate into the substrate takes place from said wall along a diffusion front parallel to said wall and radially inwards towards said axis of the body to merge at said axis along a length corresponding to the depth of penetration of the body into the substrate as measured along said axis, the reactivity of the active substance and agent being the subject of the investigation.

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4,591,557

## PROCESS AND MATERIALS FOR PRODUCING SOLUBLE BIOLOGICAL MEDIATORS FROM WHITE BLOOD CELLS

Lynne D. Keyes, New Brunswick, and Douglas Testa, Neshanic Station, both of N.J., assignors to Interferon Sciences, Inc., New Brunswick, N.J.

Filed Dec. 2, 1982, Ser. No. 446,160
Int. Cl.[4] C12P *21/00;* A01N *1/02;* C12P *21/02, 19/34;* C12N *5/00, 5/02;* C01G *9/00*
U.S. Cl. 435—68 8 Claims

1. In a process for producing gamma interferon from white blood cells wherein the gamma interferon is produced by inducing the white blood cells with a mitogenic or antigenic agent and collecting the gamma interferon generated by the induced cells, the improvement comprising inducing the white blood cells in the presence of an effective amount of red blood cells or a red blood cell fraction which comprises cell membranes so as to enhance the induction of gamma interferon by the mitogenic or antigenic agent by a factor of about two or more in comparison with the amount of gamma interferon produced in the absence of red blood cells.

4,591,558

## NOVEL SUBSTANCES HAVING ANTITUMOR AND IMMUNOSTIMULATING ACTIVITY, PROCESS FOR PREPARING THE SAME AND ANTITUMOR AGENT CONTAINING THE SAME

Kenzo Tamai, Kanazawa; Isamu Saikawa, Toyama; Takashi Yasuda, Toyama; Shohachi Murakami, Toyama; Toyoo Maeda, Kanazawa; Hisatsugu Tsuda, Toyama; Hiroshi Sakai, Takaoka; Masatoshi Sugita, Toyama; Yoshiko Yamamoto, Namekawa; Hisashi Minami, Toyama, and Takako Hori, Toyama, all of Japan, assignors to Toyama Chemical Co., Ltd., Tokyo, Japan

Division of Ser. No. 347,871, Feb. 11, 1982, Pat. No. 4,477,437.
This application Aug. 6, 1984, Ser. No. 619,895
Claims priority, application Japan, Feb. 19, 1981, 56-22270; Feb. 19, 1981, 56-22271; Feb. 19, 1981, 56-22272; Feb. 19, 1981, 56-22273; Feb. 19, 1981, 56-22274; Feb. 19, 1981, 56-22275; Feb. 19, 1981, 56-22276; Feb. 19, 1981, 56-22277; Jan. 29, 1982, 57-11744
Int. Cl.[4] C12P *21/00, 19/26;* C12N *1/20;* A61K *37/00*
U.S. Cl. 435—68 50 Claims

1. A process for preparing an antitumor TF-2 substance selected from the group consisting of

TF-210 which has the following properties:

(a) grayish white-light brown powder;

(b) it prohibits the proliferation of Ehrlich ascites tumor, Ehrlich solid tumor, Sarcoma 180 and B-16 Melanoma of mouse, and has immunostimulating activity;

(c) it is insoluble in methanol, ethanol, acetone, benzene, chloroform, ethyl acetate and diethyl ether;

(d) it has no clear melting point and decomposes at 160° to 235° C.;

(e) its infrared absorption spectrum obtained by a KBr tablet method has absorption bands at approximately 3600–3200, 2950–2920, 1680–1620, 1550–1510, 1440, 1380, 1240–1220 and 1120–1020 $cm^{-1}$;

(f) the ultraviolet absorption spectrum of an aqueous solution of its water-soluble fraction at a pH of 7.0 shows a strong absorption at the absorption edge, and shows an absorption peak at approximately 284–265 nm;

(g) it is positive in Molisch reaction, phenol-sulfuric acid reaction, anthrone-sulfuric acid reaction, indole-hydrochloric acid reaction and Lowry-Folin's reaction;

(h) has elementary analysis values of C: 40–43%, H: 5–7%, N: 9–10%; and

(i) the saccharide content of the water-soluble fraction at a pH of 7 as determined by a phenol-sulfuric acid method is about 5–25% by weight in terms of glucose, and the protein content as determined by Lowry-Folin's method is about 20–50% by weight in terms of bovine serum albumin.

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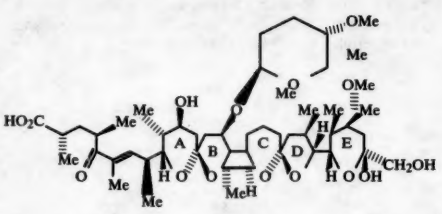
4,591,559

## ANTIBIOTIC X-14934A AND A METHOD FOR ITS PREPARATION

Chao-Min Liu, and John Westley, both of Cedar Grove, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 518,233, Jul. 28, 1983, Pat. No. 4,510,317.
This application Jan. 22, 1985, Ser. No. 693,447
Int. Cl.[4] C12P *19/62;* C12R *1/51*
U.S. Cl. 435—76 1 Claim

1. A process to produce a compound of the formula



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which comprises cultivating a strain of Streptomyces X-14934 in an aqueous carbohydrate solution containing a nitrogenous nutrient under submerged aerobic conditions and thereafter isolating the compound of formula I from said solution.

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4,591,560

## PROCESS FOR SACCHARIFICATION OF STARCH USING ENZYME PRODUCED BY FUNGUS BELONGING TO GENUS CHALARA

Keiji Kainuma, and Shoichi Kobayashi, both of Sakura, Japan, assignors to Director of National Food Research Institute Ministry of Agriculture, Forstry and Fisheries, Yatabe, Japan

Filed Dec. 29, 1983, Ser. No. 566,499
Claims priority, application Japan, Jan. 17, 1983, 58-5564
Int. Cl.[4] C12P *19/20, 19/14;* C12N *9/30, 9/34;* C12R *1/645*
U.S. Cl. 435—96 10 Claims

1. A process for the saccharification of starch to produce glucose, which comprises contacting a starch with an amylase produced by a fungus belonging to the genus Chalara to produce glucose in an aqueous medium having a pH of from 3 to 9.5 at a temperature of from 30° to 50° C. to produce said glucose, and recovering said glucose, said amylase has a pH stability of 3–9.5, an optimum temperature of 45° C. for raw starch and of 50° C. for gelatinized starch and thermostability of 45° C.

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4,591,561

## PROCESS FOR THE PREPARATION OF MALTOPENTAOSE

Naohiro Yoshigi; Takahide Chikano, and Yoshitada Mori, all of Tokyo, Japan, assignors to Sapporo Breweries Limited, Tokyo, Japan

Filed Aug. 26, 1983, Ser. No. 527,181
Claims priority, application Japan, Sep. 13, 1982, 57-158099
Int. Cl.[4] C12P *19/04, 19/14;* C12R *1/085*
U.S. Cl. 435—101 10 Claims

1. A process for preparing maltopentaose which comprises cultivating the maltopentaose-producing microorganism Bacillus cereus NY-14 (FERM BP-329) in a medium comprising a polysaccharide having an α-1,4-glucosidic linkage to produce and accumulate maltopentaose in a culture broth, and recovering the maltopentaose therefrom.

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4,591,562

## METHOD FOR PRODUCING L-PHENYLALANINE BY FERMENTATION

Osamu Kurahashi, Kawasaki; Takayasu Tsuchida, Yokohama; Hiroki Kawashima, Kawasaki, and Hitoshi Enei, Zushi, all of Japan, assignors to Ajinomoto Company Incorporated, Tokyo, Japan

Filed Aug. 2, 1983, Ser. No. 519,714
Int. Cl.[4] C12P *13/22, 21/00, 21/02, 19/34;* C12N *15/00, 1/20, 1/00;* C12R *1/125;* C07H *21/04*
U.S. Cl. 435—108 4 Claims

1. A method for producing L-phenylalanine by fermentation which comprises aerobically culturing an L-phenylalanine-producing microorganism in an aqueous culture medium, and recovering the L-phenylalanine accumulated in the culture

medium; said L-phenylalanine producing microorganism having been constructed by incorporating a recombinant plasmid DNA, into which a DNA fragment controlling resistance to a phenylalanine-antagonist, obtained from a chromosomal DNA of a mutant of the species *Bacillus subtilis* resistant to the phenaylalanine-antagonist, has been inserted, into a recipient strain of the species *Bacillus subtilis.*

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**4,591,563**

**PROCESS FOR THE PURIFICATION OF DEXTRAN-SUCRASE**

**Francois Paul, Saint-Orens; Pierre Monsan, Blagnac, and Daniel Auriol, Maury, all of France, assignors to Societe Nationale Elf Aquitaine, Courbevoie, France**

**Filed May 3, 1984, Ser. No. 606,642**

**Claims priority, application France, May 6, 1983, 83 07650**

**Int. Cl.[4] C12N *9/10;* C12R *1/01***

**U.S. Cl. 435—193** **8 Claims**

1. A process for the simultaneous purification and concentration of the dextran sucrase enzyme from the culture medium in which *Leuconostoc mesenteroides* bacteria are grown on sucrose to produce the extra cellular enzyme, the said medium containing dextran, which process comprises the steps of:

(a) adding to said medium an aqueous solution of a polyglycol in an amount such that said dextran and polyglygol form two non-miscible phases;

(b) maintaining said medium under stirring conditions in order to ensure close and prolonged contact between the two phases, and

(c) separating a dextran-rich first phase of the medium from the polyether-rich second phase, the first phase constituting a dextran sucrase enriched enzymatic preparation.

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**4,591,564**

**TRANSFERASE ENZYMES WHICH MODIFY THE 3'-TERMINI OF RIBONUCLEIC ACID AND METHODS**

**Kenneth F. Watson, Lolo, Mont., assignor to The University of Montana, Missoula, Mont.**

**Filed Nov. 10, 1982, Ser. No. 440,602**

**Int. Cl.[4] C12N *9/12;* C12Q *1/68;* C12P *19/34***

**U.S. Cl. 435—194** **5 Claims**

1. A method for the isolation of three ribonucleotidyl terminal transferase enzymes, said enzymes having the capability of modifying the 3' terminus of ribonucleic acid molecules by the addition of ribonucleotide units using ribonucleotide triphosphates as substrates, said method comprising:

(a) injecting of chicks with avian myeloblastosis virus so that the chicks develop acute leukemia characterized by a high percentage of myeloblasts in the peripheral blood;

(b) removing the blood and isolating the myeloblasts;

(c) eliminating the myeloblasts' nuclei;

(d) separating and fractionating proteins;

(f) determining enzyme activity, and

(g) recovering the terminal transferase enzymes.

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**4,591,565**

**METHOD FOR THERMAL DESTABILIZATION OF MICROBIAL RENNET**

**Sven Branner-Jorgensen, Charlottenlund; Palle Schneider, Ballerup, and Peter Eigtved, Copenhagen, all of Denmark, assignors to Novo Industri A/S, Denmark**

**Continuation of Ser. No. 138,460, Apr. 8, 1980, abandoned. This application May 3, 1982, Ser. No. 374,493**

**Claims priority, application Denmark, Apr. 9, 1979, 79.1457**

**The portion of the term of this patent subsequent to Nov. 2, 1999, has been disclaimed.**

**Int. Cl.[4] C12N *9/58, 9/99;* A23C *19/032***

**U.S. Cl. 435—223** **1 Claim**

1. A method for producing microbial rennet having reduced thermal stability in cheese making comprising reacting *Mucor Miehei* microbial rennet in an aqueous medium with effective amounts of a modifying agent selected from the group consisting of peracetic acid and salts thereof to produce a microbial rennet which has reduced thermal stability by at least 8° C. and which retains no less than 70% of its milk coagulating activity.

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**4,591,566**

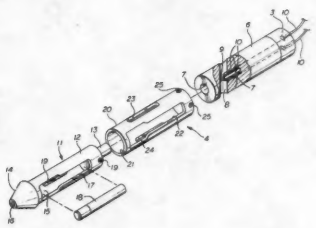
**BIOLOGICAL INDICATOR PROBE FOR STEAM STERILIZING SYSTEMS**

**William B. Smith, Bloomington, Ill., assignor to Bio-Environmental Systems, Inc., Champaign, Ill.**

**Filed Nov. 25, 1983, Ser. No. 555,123**

**Int. Cl.[4] C12M *1/34, 1/00, 1/24;* C12Q *1/22***

**U.S. Cl. 435—291** **21 Claims**



14. A biological indicator probe system comprising,

an elongated rod of heat resistant plastic material,

a test probe chamber element of non-metallic, heat resistant material removably secured in the end of said rod,

said test probe chamber element being of heat resistant plastic material and hollow to provide a chamber for receiving a biological test specimen vial and having an opening in the side wall thereof for insertion of a specimen vial,

a closure sleeve member rotatably positioned on said test probe chamber element and having an opening in the wall thereof of sufficient size for insertion of a specimen vial therethrough when rotated to align said test probe chamber element opening and said sleeve member opening and being rotatable to another position providing a closure for said test probe chamber element opening to retain a test specimen vial therein and having openings exposing a vial to a sterilizing environment, and

a tubular biological test specimen vial, containing biological material capable of inactivation at a selected temperature, positioned in said chamber to indicate the presence of conditions destructive of a biologically contaminated mass into which said probe is inserted during sterilization in a thermal autoclave.

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**4,591,567**

**RECOMBINANT DNA SCREENING SYSTEM INCLUDING FIXED ARRAY REPLICATOR AND SUPPORT**

**Roy J. Britten, Costa Mesa, and Eric H. Davidson, Pasadena, both of Calif., assignors to California Institute of Technology, Pasadena, Calif.**

**Continuation-in-part of Ser. No. 370,412, Apr. 21, 1982, abandoned. This application Aug. 8, 1983, Ser. No. 520,756**

**Int. Cl.[4] C12M *1/32, 1/26;* C12Q *1/68, 1/24***

**U.S. Cl. 435—293** **6 Claims**

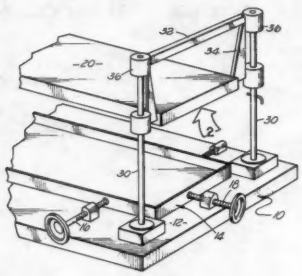
1. A device adapted to replicate recombinatnt DNA libraries of eukaryotic genomes in fixed arrays comprising:

(a) container means of a size adapted to contain phage or bacteria in a random array of at least about 50,000 plaques,

(b) in proximinty to said container means, a multipoint simultaneous transfer means containing at least about 50,000 rigid points having fixed distance between points and being adapted to transfer phage or bacteria from colonies such that locations are precisely maintained, all of the free ends of said points terminating a plane for simultaneous

contact with and penetration of the surface containing the phage or colony,

(c) carrying and aligning means for maintaining said transfer means in superposed relationship with respect to said container means including vertical slide members adjacent corners of said transfer means whereby said transfer means can be slidably moved toward and away from said container means while maintaining the container means and transfer means in essentially constant registry, said




container means and transfer means being generally coextensive in area and shape, and said container means being provided with micrometer adjustment and restraining means in both the "X" and "Y" axes for controlled small lateral displacement of said container means with respect to said transfer means and said carrying and aligning means, and

(d) a base member, wherein said vertical slide members, said container means and said adjustment and restraining means are carried by said base member.

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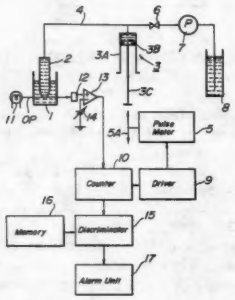
**4,591,568**

## LIQUID DISTRIBUTING DEVICE FOR USE IN CHEMICAL ANALYZER

**Taiichi Banno; Ryo Fujimori, both of Hachioji; Hiroshi Takekawa, Sagamihara, and Kazuo Hijikata, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 330,449, Dec. 14, 1981, Pat. No. 4,448,752. This application Jan. 5, 1984, Ser. No. 568,414**
**Claims priority, application Japan, Dec. 12, 1980, 55-175490**
**Int. Cl.[4] G01N *1/14***
**U.S. Cl. 436—180** **3 Claims**




1. In the method for delivering a sample solution contained in a sample container into a plurality of reaction vessels for effecting a plurality of tests with said sample solution comprising the steps of: immersing a probe into a source of sample solution, aspiriating said sample solution into said probe, and discharging the aspirated solution into said plurality of reaction vessels, the improvement comprising:

(a) measuring an amount of sample solution that has actually been aspirated into the probe;

(b) comparing the amount of sample solution that has actually been aspirated into the probe to a required amount of sample solution for effecting all of the plurality of tests;

(c) determing from step (b) the maximum number of reaction vessels into which a sufficient amount of sample solution could be discharged based on the actual amount of sample solution aspirated;

(d) successively discharging the sample solution into each of a first predetermined number of reaction vessels, sufficient for effecting all of said plurality of tests, when said maximum number is at least equal to said first predetermined number of reaction vessels; and

(e) successively discharging the sample solution only into a second predetermined smaller number of reaction vessels when said maximum number is less than said first predetermined number of reaction vessels.

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**4,591,569**

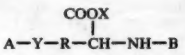
## HOMOGENEOUS FLUORESCENT TRIIODOTHYRONINE UPTAKE TEST

**Daniel B. Wagner, Raleigh, and Luther W. Dasher, Durham, both of N.C., assignors to Becton Dickinson & Company, Paramus, N.J.**

**Filed Apr. 11, 1984, Ser. No. 599,143**
**Int. Cl.[4] G01N *33/53, 33/557, 33/542***
**U.S. Cl. 436—500** **7 Claims**

1. In an assay for determining the thyroid hormone binding capacity of a serum sample, the improvement comprising:

mixing a $T_3$ tracer with a serum sample, and determining the $T_3$ uptake of the sample by fluorescent enhancement without separating bound and unbound portions of $T_3$ tracer; said $T_3$ tracer comprising a compound having the following structural formula:



wherein

X is selected from the group consisting of hydrogen, amine salt, ammonium and metal cations

Y is —NH— or

and

R is selected from the group consisting of substituted and unsubstituted divalent hydrocarbon radicals having from 1 to 13 carbon atoms, and wherein —R—and —CH— may be linked to form a carbocyclic chain; and

A is one of a $T_3$ radical and a fluorescein dye and B is the other of a $T_3$ radical and a fluorescein dye.

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**4,591,570**

## MATRIX OF ANTIBODY-COATED SPOTS FOR DETERMINATION OF ANTIGENS

**Tse-Wen Chang, Paoli, Pa., assignor to Centocor, Inc., Malvern, Pa.**

**Filed Feb. 2, 1983, Ser. No. 463,188**
**Int. Cl.[4] G01N *33/543, 33/552, 33/545***
**U.S. Cl. 436—518** **21 Claims**

1. An immunoassay device comprising a support having a substantially planar surface and having an array of small, discrete, closely spaced antibody-coated areas on the planar surface, the antibodies in the discrete, antibody-coated surface areas being absorbed to the planar surface at a density and

uniformity such that when cells bearing a surface antigen are brought into contact in sufficient concentration with a discrete, antibody-coated area containing antibodies which bind the antigen, the cells adhere tightly to the discrete, antibody-coated area and form a layer of bound cells which is substantially microscopically uniform over essentially all of the discrete antibody-coated area.

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**4,591,571**

**FINE CARRIER PARTICLES SENSITIZED WITH ACYLATED ANTIBODY FOR ANTIGEN DETECTION**

**Morio Kuboyama, Tokyo; Yoshitsugu Harada, Yokohama; Akio Kawashiri, Fujimi, and Eiji Takahashi, Funabashi, all of Japan, assignors to Morinaga Milk Industry Co., Ltd., Tokyo, Japan**

**Filed Apr. 18, 1984, Ser. No. 601,522**
**Claims priority, application Japan, Apr. 28, 1983, 58-74123**
**Int. Cl.⁴ G01N *33/546***
**U.S. Cl. 436—533** **6 Claims**

1. In a reagent comprising antibody-sensitized fine carrier particles for detecting antigen in body fluids by agglutination or agglutination inhibition, the improvement comprising:

antibody-sensitized fine carrier particles wherein the antibody has been chemically modified with an acylating agent.

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**4,591,572**

**PIGMENTATION ASSOCIATED, DIFFERENTIATION ANTIGEN OF HUMAN MELANOMA AND AUTOLOGOUS ANTIBODY**

**M. Jules Mattes, Jamaica Estates; Timothy M. Thomson; Lloyd J. Old, both of New York, and Kenneth O. Lloyd, Bronx, all of N.Y., assignors to Sloan-Kettering Institute for Cancer Research, New York, N.Y.**

**Filed Apr. 1, 1983, Ser. No. 481,379**
**Int. Cl.⁴ G01N *33/54***
**U.S. Cl. 436—538** **14 Claims**

1. Substantially pure antibody which specifically binds to the pigmentation-associated gp70 antigen specific to melanocytes and melanomas, said antigen having an isoelectric point of 5.2.

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**4,591,573**

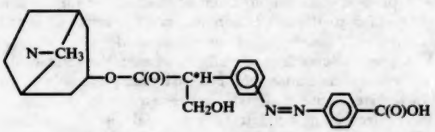
**SENSITIVE RADIOIMMUNOASSAY USING ANTIBODY TO L-HYOSCYAMINE**

**Pritam S. Verma, Adelphi, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Sep. 23, 1983, Ser. No. 535,190**
**Int. Cl.⁴ G01N *33/56*; A61R *39/00*; C07G *7/00***
**U.S. Cl. 436—542** **13 Claims**

1. An immunogen for the production of an antibody to L-hyoscyamine antigen produced by the process comprising:

(a) allowing L-hyoscyamine to react with diazotized p-aminobenzoic acid at an acidic pH to produce a hapten having the structural formula




wherein the levatory asymmetry of the asymmetric carbon C* is retained, said diazotized p-aminobenzoic acid synthesized from 1 part-by-weight sodium nitrite to 1–1.4 parts-by-weight p-aminobenzoic acid; and

(b) allowing said hapten of L-hyoscyamine to conjugate with bovine serum albumin to form L-hyoscyamine-bovine serum albumin immunogen, said immunogen having conjugated at least 42 hapten molecules per molecule of bovine serum albumin.

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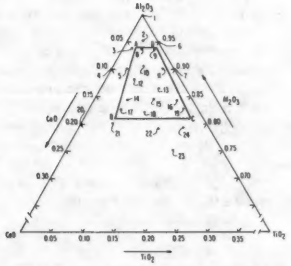
**4,591,574**

**ALUMINA PORCELAIN COMPOSITION**

**Minato Ando; Masaaki Ito, and Fumio Mizuno, all of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan**

**Filed Feb. 21, 1985, Ser. No. 703,959**
**Claims priority, application Japan, Feb. 21, 1984, 59-32113**
**Int. Cl.⁴ C04B *35/10, 35/46***
**U.S. Cl. 501—136** **1 Claim**



1. An aluminum porcelain composition of the ternary $Al_2O_3$—CaO—$TiO_2$ system having a compositional range defined by points A, B, C and D in the composition diagram set forth in the drawing, wherein the points A, B, C, and D represent the following molar fractions of $Al_2O_3$, CaO, and $TiO_2$:

| | $Al_2O_3$ | CaO | $TiO_2$ |
|---|---|---|---|
| point A | 0.94 | 0.04 | 0.02 |
| point B | 0.81 | 0.14 | 0.05 |
| point C | 0.81 | 0.02 | 0.17 |
| point D | 0.94 | 0.01 | 0.05. |

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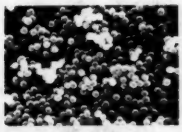
**4,591,575**

**NOVEL CRYSTALLINE METAL OXIDE AND PROCESS FOR PRODUCTION THEREOF**

**Minahiro Okabayashi; Shigeki Yuasa, both of Fujisawa, and Koshi Kusumoto, Kamakura, all of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Yamaguchi, Japan**

**Filed May 3, 1984, Ser. No. 606,610**
**Claims priority, application Japan, May 4, 1983, 58-77502**
**Int. Cl.⁴ C04B *35/16*; C09K *3/10***
**U.S. Cl. 501—154** **9 Claims**



4. A process for producing spherical particles comprising a crystalline metal oxide in the form of a solid solution comprising (i) an oxide of a metal of Group II of the periodic table, (ii) titanium oxide and silicon oxide as main components and hav-

ing main peaks at about 26.7° and about 20.9° in its Cu-Kα X-ray diffraction pattern (2θ), a refractive index of 1.53 to 1.60 and a particle diameter of 0.1 to 1.0 micrometer, which comprises partially hydrolyzing a hydrolyzable organic silicon compound in an organic solvent, mixing the partially hydrolyzed product, a hydrolyzable compound of a metal of Group II of the periodic table and a hydrolyzable organic titanium compound in an organic solvent, adding the mixed solution to a hydrous alcoholic solution containing ammonia or an amine compound to form a reactiion product, and thereafter calcining the reaction product at a temperature and for a period of time sufficient to crystallize said product, the amounts of the Group II metal compound, the titanium compound and the silicon compound being such that the crystalline metal oxide is comprised of from about 0.2 to 5 mole percent of the Group II metal oxide, from about 0.2 to 5 mole percent of the titanium oxide and not less than about 91 mole percent of silicon oxide.

8. A composite material comprising (a) a polymerizable vinyl monomer and (b) spherical particles comprising a crystalline metal oxide in the form of a solid solution comprising (i) from about 0.2 to 5 mole% of an oxide of a metal of Group II of the periodic table, (ii) from about 0.2 to 5 mole% of titanium oxide and (iii) at least 91 mole% of silicon oxide and having main peaks at about 26.7° and about 20.9° in its Cu-Kα X-ray diffraction pattern (2θ), a refractive index of 1.53 to 1.60 and a particle diameter of 0.1 to 1.0 micrometer.

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**4,591,576**

## PROCESS FOR PREPARING CATALYTIC CRACKING CATALYSTS

**Robert L. Chiang, Oakland, N.J.; Raymond G. Perigard, Ossining, and Jule A. Rabo, Armonk, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.**

**Filed Oct. 3, 1984, Ser. No. 659,641**

**The portion of the term of this patent subsequent to May 13, 2003, has been disclaimed.**

**Int. Cl.⁴ B01J** *29/06*

**U.S. Cl. 502—65** **74 Claims**

1. A process for preparing a catalyst comprising the following steps:

(i) contacting a mixture of a large pore zeolite and an inorganic oxide matrix, with a fluoro salt of the formula

$$A_{(n-m)}[MF_n]_z \quad (1)$$

wherein "A" is an organic or inorganic ionic moiety; $[MF_n]_z$ is a fluoroanion moiety comprising the element "M"; "M" is an element selected from the group of elements from Groups VB, VIB, VIIB, VIII, IIIA, IVA and VA of the Periodic Table of Elements; "n" is the coordination number of "M"; "m" is the valence of "M"; and "z" is the valence or charge associated with "A"; at a pH greater than 7, at effective conditions of temperature and time.

3. The process of claim 1 or 2 wherein the product is cation exchanged with a catalytically effective amount of at least one rare earth cation selected from the class consisting of cerium, lanthanum, praseodymium, neodymium, promethium, samarium, europium, lutetium, gadolinium, terbium, dysprosium, holmium, erbium, thulium and ytterbium.

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**4,591,577**

## SOLID CATALYST COMPONENT FOR ALPHA-OLEFIN POLYMERIZATION AND PROCESS FOR PRODUCING SAME

**Akihiro Sato; Masami Tachibana, both of Ichiharashi; Hiroshi Shimizu, Chibaken, and Toshihiro Uwai, Ishiharashi, Japan, assignors to Chisso Corporation, Osaka, Japan**

**Filed Jun. 4, 1985, Ser. No. 740,999**

**Claims priority, application Japan, Jul. 6, 1984, 59-140322**

**Int. Cl.⁴ C08F** *4/64*

**U.S. Cl. 502—105** **5 Claims**

2. A process for producing a solid catalyst component for α-olefin polymerization, which process comprises reacting $TiCl_4$ with a reaction product (I) of an organoaluminum compound ($A_1$) with an electron donor (B) under a vigorous agitation defined by an agitation power required of 0.30 KW/m³ or greater and a baffle ratio of 0.15 or greater to obtain a solid product (II) which is further reacted with an electron donor ($B_2$) and an electron acceptor (E) to obtain a solid catalyst component for α-olefin polymerization having an average particle diameter of 2 to 10 microns and a spherical shape.

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**4,591,578**

## CATALYST OF MOLYBDENUM ON WIDE-PORE CARBON SUPPORT

**Henry C. Foley, East Norwalk, and Michael P. O'Toole, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Feb. 4, 1985, Ser. No. 698,060**

**Int. Cl.⁴ B01J** *21/18, 23/28, 23/64*

**U.S. Cl. 502—185** **4 Claims**

1. Catalyst particles comprising catalytic molybdenum and a second metal selected from rhodium and palladium on particulate carbon which has a pore size distribution curve characterized by a single sharp peak at a pore radius above 10 Å, surface area greater than 100 square meters per gram, pore volume greater than 0.2 cc/g, average pore radius of at least 25 Å and compacted bulk density in the range from about 0.3 to about 0.8 g/cc.

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**4,591,579**

## PROCESS FOR PREPARING A TRANSITION METAL-SILICATE CATALYST

**Cornelis M. Lok, Rockanje, and Keshab L. Ganguli, Bleiswijk, both of Netherlands, assignors to Internationale Octrooi Maatschappij "Octropa" B.V., Rotterdam, Netherlands**

**Filed Dec. 5, 1984, Ser. No. 678,798**

**Claims priority, application Netherlands, Dec. 6, 1983, 8304184**

**Int. Cl.⁴ B01J** *23/70, 21/08*

**U.S. Cl. 502—244** **16 Claims**

1. A process for the preparation of a transition metal-silicate catalyst in which an insoluble, basic compound of a transition metal having an atomic number between 26 and 30 is precipitated with an alkaline precipitation agent from an aqueous solution of such a metal salt, as a suspension, which precipitate is allowed to mature in suspended form and is subsequently separated, dried and reduced, wherein, after the transition metal ions have been practically completely precipitated, soluble silicate is added.

3. A process according to claim 1, wherein the soluble silicate is added to the suspension within 15 minutes after the precipitation of the metal has been completed.

4. A process according to claim 1, wherein the soluble silicate is added in an amount of 0.1 to 0.6 moles, preferably 0.2 to 0.4 of silicate per mole of metal in the suspension.

16. A transition metal/transition metal silicate catalyst, which contains 30 to 70% of active metal, calculated on the total weight of the catalyst, wherein the active metal surface area is between 100 and 160 $m^2/g$ in the case of nickel and between 1 and 25 $m^2/g$ in the case of cobalt and copper, and wherein the BET total surface area and the pore volume are at least 20% higher and the filtration speed from the hydrogenated mixture is at least 5× that of a co-precipitated catalyst of the same composition.

4,591,580

## STABILIZED AND DOUBLY PROMOTED PLATINUM GROUP METAL CATALYSTS FOR EMISSION CONTROL AND METHOD OF MAKING SAME

Gwan Kim, Olney, and Michael V. Ernest, Catonsville, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 461,119, Jan. 26, 1983, Pat. No. 4,476,246. This application Jul. 10, 1984, Ser. No. 629,309

Int. Cl.[4] B01J *21/04, 23/10, 23/58*

U.S. Cl. 502—303 22 Claims

1. A catalyst suitable for use as a catalyst for auto emission control comprising an alumina support with components deposited thereon consisting essentially of lanthana as a stabilizer in an amount of about 1 to 10% by weight expressed as $La_2O_3$ which is either in the form of lanthana only or in the form of lanthana-rich rare earth oxides where the $La_2O_3$ is at least 50% by weight of the total rare earth oxides, 1–20% by weight of ceria as a promoter, at least 0.5 to about 5% by weight of an alkali metal oxide as a promoter, and a catalytically-effective amount of one or more platinum group metals.

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4,591,581

## METHOD FOR MAKING ABSORBENT MATERIALS

John R. Crampton, East Grinstead, and Howard Whiting, Redhill, both of United Kingdom, assignors to Laporte Industries Limited, London, England

Filed Jan. 28, 1983, Ser. No. 461,737

Int. Cl.[4] B01J *21/08;* A01K *1/015*

U.S. Cl. 502—407 13 Claims

1. A process for the manufacture of adsorbent clay mineral particles suitable for use as a litter comprising selecting particles of the clay mineral smaller than 2 mm in size, drying the clay mineral particles smaller than 2 mm in size to a moisture content not exceeding 15% by weight while retaining at least a quantity of moisture to allow the formation of compacted masses therefrom, mixing the clay mineral particles smaller than 2 mm in size with from 0.2% to 5% by weight of a water dispersible additive having colloidal properties in water to form a mixture having a final moisture content not exceeding 15% by weight, compacting the mixture in a press to form compacted masses of the clay mineral particles and breaking the compacted masses into particles larger in size that the selected clay mineral particles and in the 710 micron to 4 mm size range.

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4,591,582

## ORGANOPHOSPHORUS COMPOUNDS USEFUL AS ANTICONVULSANT AGENTS

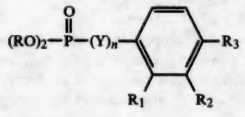
Lindley A. Cates, Houston, Tex., assignor to Research Corporation, New York, N.Y.

Filed Apr. 17, 1984, Ser. No. 601,149

Int. Cl.[4] A61K *31/66*

U.S. Cl. 514—114 11 Claims

1. A process for treating a convulsive disorder, said process comprising administering to a host an anticonvulsant effective amount of an organophosphorus compound having the general formula:



wherein R is alkyl, X is O or S, Y is O or S, n is an integer from 0 to 1, $R_1$, $R_2$ and $R_3$ are selected from the group consisting of $NH_2$ and

wherein $R_4$ is alkyl, with the proviso that only one of $R_1$, $R_2$ and $R_3$ can be $NH_2$ or

and

with the further proviso that when n is 1, $R_1$ or $R_2$ or $R_3$ is

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4,591,583

## PHOSPHONOFORMIC ACID ESTERS AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

Ake J. E. Helgstrand; Karl N. Johansson, both of Enhörna; Alfons Misiorny, Bandhagen; Jan O. Norén, Grödinge, and Göran B. Stening, Södertälje, all of Sweden, assignors to Astra Lakemedel Aktiebolag, Sodertalje, Sweden

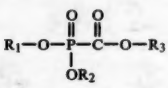
Division of Ser. No. 93,167, Nov. 13, 1979, Pat. No. 4,386,081, which is a continuation-in-part of Ser. No. 971,896, Dec. 21, 1978, abandoned. This application Dec. 17, 1982, Ser. No. 450,656

Claims priority, application United Kingdom, Dec. 22, 1977, 53580/77; Dec. 22, 1977, 53581/77; Dec. 22, 1977, 53582/77; Dec. 22, 1977, 53583/77; Jul. 3, 1978, 28548/78; Jul. 3, 1978, 28552/78; Jul. 3, 1978, 28553/78; Jul. 3, 1978, 28555/78

Int. Cl.[4] A61K *31/66*

U.S. Cl. 514—120 7 Claims

1. A method for treatment of viral infections in animals including man, comprising administering to an animal so infected a compound of the formula



(I)

wherein $R_1$ is selected from the group consisting of hydrogen, alkyl containing 1–6 carbon atoms, cycloalkyl containing 3–6 carbon atoms, cycloalkyl-alkyl containing 4–6 carbon atoms, 1-adamantyl, 2-adamantyl and benzyl; $R_2$ is hydrogen and $R_3$ is selected from the group containing hydrogen and benzyl, provided that when $R_3$ is H, then $R_1$ is alkyl, cycloalkyl or cycloalkyl-alkyl as defined above, or 1-adamantyl, 2-adamantyl or benzyl, or a physiologically acceptable salt or an optical isomer thereof in an amount sufficient for treating said viral infections.

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4,591,584

## AZO-BIS-SALICYLIC ACID AND SALT THEREOF, TO TREAT INFLAMMATORY CONDITIONS OF THE INTESTINE

Karl H. Agback, Upsala, Sweden, assignor to Pharmacia AB, Upsala, Sweden

PCT No. PCT/SE84/00226, § 371 Date Jan. 28, 1985, § 102(e) Date Jan. 28, 1985, PCT Pub. No. WO85/00013, PCT Pub. Date Jan. 3, 1985

PCT Filed Jun. 15, 1984, Ser. No. 709,032

Claims priority, application Sweden, Jun. 15, 1983, 8303399

Int. Cl.[4] A61K *31/60*

U.S. Cl. 514—160 4 Claims

1. A method of treating inflammatory conditions in the

intestine, comprising administering to a patient suffering from such condition a therapeutically active amount of 4,5'-azo-bis-salicylic acid or a therapeutically active amount of a pharmaceutically and therapeutically acceptable salt thereof.

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**4,591,585**

## 1-ALKYL-ANDROSTA-1,4-DIENE-3,17-DIONES THEIR PRODUCTION AND PHARMACEUTICAL PREPARATIONS CONTAINING SAME

**Ulrich Kerb; Gerhard Sauer; Rudolf Wiechert; David Henderson; Yukishige Nishino, and Sybille Beier, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany**

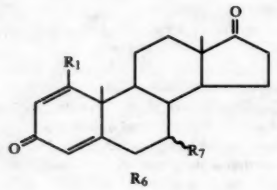
**Filed Jun. 18, 1984, Ser. No. 621,769**

**Claims priority, application Fed. Rep. of Germany, Jun. 18, 1983, 3322285**

**Int. Cl.[4] A61K *31/56***

**U.S. Cl. 514—177** **17 Claims**

**1**. 1-Alkyl-androsta-1,4-diene-3,17-diones of the formula



wherein

$R_1$ is a methyl, ethyl, hydroxymethyl, $C_1$–$C_3$-alkoxymethyl or $C_1$–$C_4$-alkanoyloxymethyl;

$R_6$ is a hydrogen atom or methyl; and

$R_7$ is a hydrogen atom or methyl.

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**4,591,586**

## 6-FLUORO-3-[3-(1-HETEROCYCLO)PROPYL]-1,2-BENZISOXAZOLES FOR TREATMENT OF PAIN, HYPERTENSION AND PSYCHOSES

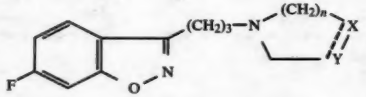
**Larry Davis, Sergeantsville, and Joseph T. Klein, Somerville, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals, Somerville, N.J.**

**Division of Ser. No. 366,245, Apr. 9, 1982, Pat. No. 4,458,075. This application Apr. 23, 1984, Ser. No. 602,791**

**Int. Cl.[4] A61K *31/55, 31/42***

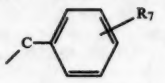
**U.S. Cl. 514—211** **6 Claims**

**2**. A method of alleviating pain comprising administering to a mammal in need of pain alleviation, a pain alleviating effective amount of a compound of the formula



wherein X is C=O, $CR_1R_2$ wherein $R_1$ is loweralkyl, phenyl or phenylloweralkyl and $R_2$ is hydrogen, cyano, loweralkylcarbonyl, phenylcarbonyl in which the phenyl group is substituted by halogen, or a group of the formula

wherein $R_3$ is loweralkyl, $CHZR_4$ wherein Z is O or S and $R_4$ is hydrogen or phenyl substituted by trifluoromethyl or one or two halogen groups, $CHNR_5R_6$ wherein $R_5$ is hydrogen or phenyl and $R_6$ is phenylcarbonyl or loweralkylcarbonyl; X is a group of the formula



wherein $R_7$ is halogen and the dotted line represents an additional carbon to carbon bond or X and Y taken together form a phenyl nucleus; n is 1, 2 or 3; an optical antipode thereof or a pharmaceutically acceptable acid additional salt thereof.

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**4,591,587**

## CYCLOPROPYL PYRIDINE COMPOUNDS USEFUL AS CALCIUM CHANNEL BLOCKERS

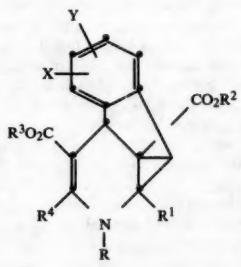
**David C. Remy, North Wales, Pa., assignor to Merck & Co., Inc., Rahway, N.J.**

**Filed Oct. 1, 1984, Ser. No. 655,786**

**Int. Cl.[4] A61K *31/44, 31/47*; C07D *221/18, 221/22***

**U.S. Cl. 514—222** **9 Claims**

**1**. A compound represented by the following general structural formula (I):



(I)

wherein:

R is hydrogen, $C_1$–$C_8$ alkyl, benzyl or $C_1$–$C_4$ carboalkoxy;

$R^1$ and $R^4$ independently are hydrogen, $C_1$–$C_8$ alkyl, $C_2$–$C_8$ alkenyl, $C_3$–$C_8$ cycloalkyl or $C_1$–$C_8$ hydroxyalkyl;

$R^2$ and $R^3$ independently are $C_1$–$C_8$ alkyl, $C_2$–$C_8$ alkenyl, $C_3$–$C_8$ cycloalkyl, $C_1$–$C_8$ hydroxyalkyl, $C_1$–$C_8$ dihydroxyalkyl, $C_2$–$C_8$ alkoxyalkyl, $C_3$–$C_8$ alkoxy(alkoxyalkyl) or $C_1$–$C_8$ aminoalkyl wherein the amino group is $NR^5R^6$ in which $R^5$ and $R^6$ independently are hydrogen, $C_1$–$C_8$ alkyl, $C_7$–$C_{14}$ phenylalkyl or $R^5$ and $R^6$ together with the N atom form a 5 or 6 membered heterocycle selected from the group consisting of piperidinyl, morpholinyl, thiomorpholinyl, pyrrolidinyl, piperazinyl or N'–$C_1$–$C_4$-alkylpiperazinyl; and

X and Y independently are hydrogen, $C_1$–$C_8$ alkyl, $C_1$–$C_8$ alkoxy, $CF_3$, cyano, nitro or halo, or X and Y together with the phenyl group to which they are attached form a naphthyl or benzoxadiazole group,

or a pharmaceutically acceptable salt thereof.

**8**. A pharmaceutical composition, useful in the treatment of cardiovascular disorders comprising a nontoxic therapeutically effective amount of a compound according to claim **1** in an admixture with a pharmaceutically acceptable carrier.

**9**. A method of treatment for cardiovascular disorders which comprises administering to a subject in need of such of such treatment a nontoxic therapeutically effective amount of a compound according to claim **1**.

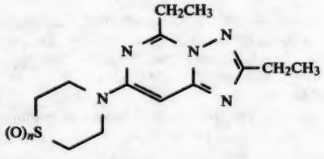
4,591,588

## TRIAZOLO[1,5-C]PYRIMIDINES AND BRONCHODILATION USE THEREOF

James J. Wade, Oakdale, Minn., assignor to Riker Laboratories, Inc., St. Paul, Minn.

Filed Feb. 24, 1984, Ser. No. 583,386
Int. Cl.[4] A61K *31/54;* C07D *487/04*
U.S. Cl. 514—222 6 Claims

1. A compound of the formula:



wherein n is 1 or 2; or a pharmaceutically acceptable acid-addition salt thereof.

5. A method for obtaining bronchodilation in a mammal, comprising administering an effective amount of a compound according to claim 1 to said mammal.

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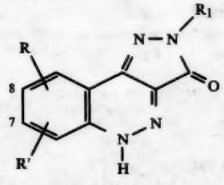
4,591,589

## 2-ARYL PYRAZOLO[4,3-C]CINNOLIN-3-ONES

Jean-Claude Gasc, Bondy; Daniel Humbert, Fontenay-sous-Bois, and Peter F. Hunt, Gonesse, all of France, assignors to Roussel Uclaf, Paris, France

Filed Jan. 16, 1985, Ser. No. 692,030
Int. Cl.[4] A61K *31/50;* C07D *487/02*
U.S. Cl. 514—248 18 Claims

1. A compound selected from the group consisting of pyrazolo[4,3-c]cinnolin-3-one compounds of the formula



I

wherein R may be in the 7- or 8-position and is selected from the group consisting of hydrogen, halogen, alkyl and alkoxy of 1 to 5 carbon atoms, —$NO_2$ and —$CF_3$ and R' is hydrogen or R and R' taken together form an alkylenedioxy of 1 to 4 carbon atoms at the 7- or 8-positions and $R_1$ is selected from the group consisting of phenyl, pyridyl, thiazolyl, dihydrothiazolyl and thienyl, all optionally substituted with at least one member of the group consisting of alkyl and alkoxy of 1 to 5 carbon atoms, halogen, mono-, di- and tri- halomethyl and aralkoxy of 7 to 12 carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts.

13. A method of treating anxiety in warm-blooded animals comprising administering to warm-blooded animals an anxiolytically effective amount of at least one compound of claim 1.

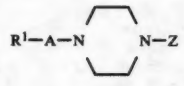
4,591,590

## BENZHYDRYLPIPERAZINE DERIVATIVES, PROCESSES FOR THE PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITION COMPRISING THE SAME

Ikuo Ueda, Toyonaka; Daizo Morino, Matsubara, and Koichi Takimoto, Takarazuka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Dec. 21, 1983, Ser. No. 563,756
Claims priority, application Japan, Dec. 24, 1982, 57-231855
Int. Cl.[4] C07D *401/12;* A61K *31/495*
U.S. Cl. 514—252 9 Claims

1. A compound of the formula:



wherein

A is a lower alkylene group,

Z is a benzhydryl group optionally substituted with a halogen atom, and

$R^1$ is (1) a pyridyl group substituted with a lower alkanesulfonylamino or di(lower alkanesulfonyl)amino group; (2) a lower alkanoylamino group optionally substituted with 2-oxo-benzothiazolin-3-yl; (3) a lower alkane sulfonylamino group; or (4) a phenyl(lower)alkanoylamino group optionally substituted with two lower alkoxy groups;

and its pharmaceutically acceptable salts.

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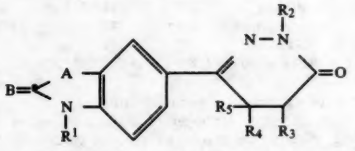
4,591,591

## PYRIDAZINONE DERIVATIVES AS INOTROPIC AGENTS

David W. Robertson, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Mar. 8, 1984, Ser. No. 587,732
Int. Cl.[4] A61K *31/50, 31/495, 31/535*
U.S. Cl. 514—254 8 Claims

1. A method of treating a mammal, including a human subject, suffering from heart failure, which comprises administering to said mammal an effective amount of a compound of the formula



I

or a pharmaceutically acceptable salt thereof, wherein

A is methylene, ethylene, $C_1$–$C_4$ alkyl substituted ethylene, vinylene, or $C_1$–$C_4$ alkyl substituted vinylene;

$R_1$ is hydrogen, $C_1$–$C_4$ alkyl, $C_2$–$C_4$ alkanoyl, methyl- or ethyl-sulfonyl, or benzoyl optionally substituted on the phenyl ring with one or more substituents selected from the group consisting of halogen, $C_1$–$C_4$ alkyl, methoxy and ethoxy;

$R_2$ is hydrogen, $C_1$–$C_{22}$ alkyl, hydroxy-substituted $C_1$–$C_3$ alkyl, carbamoyl-substituted $C_1$–$C_{11}$ alkyl, naphthyloxymethyl or -ethyl, a $C_1$–$C_5$ oxoalkyl group or $R_6R_7N$—$(CH_2)_n$— where each of $R_6$ and $R_7$ is independently hydrogen or $C_1$–$C_4$ alkyl, or when taken together with the nitrogen atom to which they are attached form a pyrrolidine, piperidine, morpholine, piperazine, or N-methylpiperazine ring, and n is 2 or 3;

$R_3$ is hydrogen;

$R_4$ is hydrogen, $C_1$–$C_4$ alkyl, hydroxymethyl, or $C_2$–$C_4$ alkanoyloxymethyl;
$R_5$ is hydrogen or $C_1$–$C_4$ alkyl;
or $R_3$ and one of $R_4$ and $R_5$ taken together form a bond.

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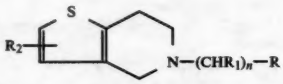
**4,591,592**

## ACID STABILIZED COMPOSITIONS OF THIENO-PYRIDINE DERIVED COMPOUNDS

**Zaka-ud-Din T. Chowhan, Sunnyvale, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Division of Ser. No. 376,878, May 10, 1982, Pat. No. 4,490,377, which is a continuation-in-part of Ser. No. 173,310, Jul. 29, 1980, abandoned. This application Oct. 29, 1984, Ser. No. 665,675**
**Int. Cl.[4] C07D *513/04*; A61K *31/435***
**U.S. Cl. 514—301** **5 Claims**

1. A stable pharmaceutical composition comprising a therapeutically effective amount of an active ingredient which is a pharmaceutically acceptable acid addition salt (PASS) of a compound having the formula



wherein:
R is phenyl or benzyl, each optionally substituted on the phenyl ring with 1 to 3 halogen atoms, alkyl of 1–6 carbon atoms, alkoxy of 1–6 carbon atoms, hydroxy or nitro;
$R_1$ is hydrogen, halogen, hydroxy or alkyl having 1–6 carbon atoms;
$R_2$ is hydrogen or halogen; and
n is 1 or 2, and when n is 2, $R_1$ may have different meanings in each ($CHR_1$) radical and a non-toxic stabilizing amount of a pharmaceutically, non-volatile acidic compound which is ascorbic acid, benzoic acid, citric acid, fumaric acid, or tartaric acid and at least one pharmaceutically acceptable excipient.

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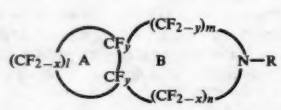
**4,591,593**

## PERFLUORO COMPOUND AND EMULSION THEREOF

**Kazumasa Yokoyama, Toyonaka; Chikara Fukaya, Osaka; Yoshio Isuda, Takarazuka; Taizo Ono, Osaka; Yoshio Arakawa, Suita, and Tadakazu Suyama, Kyoto, all of Japan, assignors to The Green Cross Corporation, Osaka, Japan**

**Filed Nov. 17, 1982, Ser. No. 442,416**
**Claims priority, application Japan, Nov. 27, 1981, 56-191357; Jun. 25, 1982, 57-110200**
**Int. Cl.[4] A61K *31/47, 31/40*; C07D *217/22, 209/10***
**U.S. Cl. 514—307** **21 Claims**

15. A method of treating a mammal suffering from massive hemorrhage comprising administering to the mammal an oxygen-carrying effective amount of an aqueous emulsion effective to transport oxygen in the mammal and having a particle size of less than 0.3μ of a perfluoro compound and represented by the formula:



wherein
R is a lower perfluoroalkyl group,
l is 3 or 4, m is 1-3, n is 0, 1 or 2 provided the sum of m+n is 2 or 3,
x is 0, 1 or 2,
y is 0 or 1, and
at least one lower perfluoroalkyl group may be substituted for a ring fluorine of ring A or ring B, and an emulsifying amount of an emulsifying agent and an emulsifier adjuvant.

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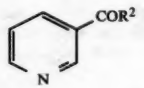
**4,591,594**

## THROMBOXANE SYNTHASE INHIBITORS AS ANTIOBESITY AGENTS

**James G. Hamilton, Nutley; Ann C. Sullivan, Cedar Grove; Lawrence D. Tobias, Glen Ridge, and Joseph Triscari, Bloomfield, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 387,721, Jun. 11, 1982, Pat. No. 4,500,540, which is a continuation of Ser. No. 107,484, Dec. 26, 1979, abandoned. This application Dec. 12, 1984, Ser. No. 680,706**
**Int. Cl.[4] A61K *31/44***
**U.S. Cl. 514—339** **10 Claims**

1. A method for the treatment of obesity in mammals which comprises administering to the mammal to be treated, an effective amount for reducing body weight of a thromboxane synthase inhibitor of the formula



wherein $R^2$ is H, $C_1$–$C_4$ alkyl, 3-indolo optionally substituted at the two position by $C_1$–$C_4$ straight or branched chain alkyl, (2-hydroxy-1-naphthalenyl)methylene hydrazide, or an optionally mono or di substituted phenyl, benzyl, or naphthyl wherein said substituents are selected from the group consisting of $C_1$–$C_3$ alkoxy, $C_1$–$C_4$ alkyl, Cl, F, Br, $NO_2$, acetyl, propionyl, butyryl and hydroxy.

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**4,591,595**

## 2-GUANIDINO-4-(2-METHYL-4-IMIDAZOLYL)-THIAZOLES IN THE TREATMENT OF RHEUMATOID ARTHRITIS

**David L. Larson, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 659,750, Oct. 11, 1984, abandoned. This application Aug. 9, 1985, Ser. No. 763,730**
**Int. Cl.[4] A61K *31/425***
**U.S. Cl. 514—367** **4 Claims**

1. A method of treating rheumatoid arthritis in a mammal suffering from said rheumatoid arthritis which comprises administering to said mammal an antirheumatoid arthritis amount of a compound which is 2-guanidino-4-(2-methyl-4-imidazolyl)thiazole, 2-(N-pentyl-N'-guanidino)-4-(2-methyl-4-imidazolyl)thiazole, or a pharmaceutically acceptable salt thereof.

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**4,591,596**

## TREATING PAIN, INFLAMMATION AND/OR PLATELET AGGREGATION

**Walter Marconi, San Donato Milanese; Francesco Bartoli, Rome; Franco Morisi, Rome, and Francesco Pittalis, Rome, all of Italy, assignors to E.N.I. Ente Nazionale Idrocarburi, Rome, Italy**

**Continuation of Ser. No. 336,828, Jan. 24, 1982, which is a continuation-in-part of Ser. No. 227,386, Jan. 22, 1981, abandoned, which is a continuation of Ser. No. 85,015, Oct. 15, 1979, abandoned. This application Nov. 17, 1983, Ser. No. 552,987**
**Claims priority, application Italy, Oct. 17, 1978, 28825 A/78**
**Int. Cl.[4] A61U *31/42***
**U.S. Cl. 514—375** **8 Claims**

1. A method of treating inflammation pain and/or platelet aggregation in mammals including human beings by administering to an afflicted animal an effective dose in the range of

100 mg/kg to 500 mg/kg, based on the body weight, of a compound of the formula:

wherein R is a mono or bihydroxyalkyl substituted amino group or a mono hydroxyalkyl substituted thio group in which one or more available hydroxyl groups have been esterified with an acid containing 2–18 carbon atoms.

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**4,591,597**

## ANTIDIABETIC IMINOSULPHONAMIDES

**Ernst Schweizer, Arlesheim, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

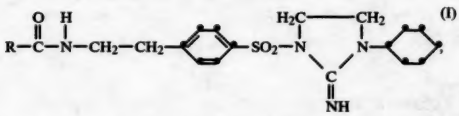
**Filed Mar. 28, 1984, Ser. No. 594,148**

**Claims priority, application Switzerland, Apr. 5, 1983, 1817/83**

**Int. Cl.[4] A61K *31/415*; C07D *233/46***

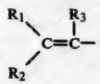
**U.S. Cl. 514—392** **9 Claims**

**1.** A compound of the formula



(I)

in which R represents the radical of the formula



(Ia)

in which

$R_1$ represents alkyl having up to 3 carbon atoms and

each of $R_2$ and $R_3$, independently of the other, represents hydrogen or methyl, or a pharmaceutically acceptable salt of such a compound.

**9.** A method of treating diabetes in a mammal comprising administering to said mammal a therapeutically effective amount of a compound of the formula I according to claim **1**.

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**4,591,598**

## DERIVATIVES OF 2-AZABICYCLO[3.1.0]HEXANE-3-CARBOXYLIC ACID, AND HYPOTENSIVE USE THEREOF

**Hansjörg Urbach, Kronberg; Rainer Henning, Hattersheim am Main, and Reinhard Becker, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

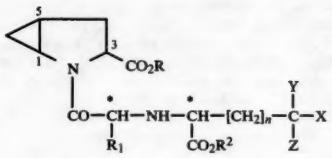
**Filed Jul. 3, 1984, Ser. No. 627,639**

**Claims priority, application Fed. Rep. of Germany, Jul. 6, 1983, 3324263**

**Int. Cl.[4] C07D *209/02*; A61K *31/40***

**U.S. Cl. 514—412** **11 Claims**

**1.** A compound of the formula I



(I)

in which the hydrogen atoms at the bridgehead carbon atoms have the cis configuration with respect to one another, and the COOR group on carbon atom 3 is oriented exo or endo to the bicyclic ring system, and in which

n denotes 0 or 1,

R denotes hydrogen, ($C_1$–$C_6$)-alkyl, ($C_2$–$C_6$)-alkenyl or ($C_6$–$C_{12}$)-aryl-($C_1$–$C_4$)-alkyl,

$R^1$ denotes hydrogen or ($C_1$ to $C_6$)-alkyl, which can optionally be substituted by amino,($C_1$ to $C_6$)-acylamino or benzoylamino, ($C_2$ to $C_6$)-alkenyl, ($C_5$ to $C_9$)-cycloalkyl, ($C_5$ to $C_9$)-cycloalkenyl, ($C_5$ to $C_7$)-cyclo- alkyl-($C_1$ to $C_4$)-alkyl, ($C_6$ to $C_{12}$)-aryl or partially hydrogenated ($C_6$–$C_{12}$)-aryl, each of which can be substituted by ($C_1$ to $C_4$)-alkyl, ($C_1$ or $C_2$)-alkoxy or halogen, ($C_6$–$C_{12}$)-aryl-($C_1$ to $C_4$)-alkyl or ($C_7$–$C_{13}$)- aroyl-($C_1$–$C_2$)-alkyl, both of which can be substituted in the aryl radical as defined above, or an optionally protected side chain of a naturally occurring $\alpha$-aminoacid $R^1$—CH($NH_2$)—COOH,

$R^2$ denotes hydrogen, ($C_1$–$C_6$)-alkyl, ($C_2$–$C_6$)-alkenyl or ($C_6$–$C_{12}$)-aryl-($C_1$–$C_4$)-alkyl,

Y denotes hydrogen or hydroxyl,

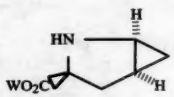
Z denotes hydrogen, or

Y and Z together denote oxygen, and

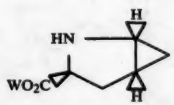
X denotes ($C_1$–$C_6$)-alkyl, ($C_2$–$C_6$)-alkenyl, (C cycloalkyl, ($C_6$–$C_{12}$)-aryl, which can be monosubstituted, disubstituted or trisubstituted by ($C_1$–$C_4$)-alkyl, ($C_1$–$C_4$)-alkoxy, hydroxyl, halogen, nitro, amino, ($C_1$–$C_4$)-alkylamino, di-($C_1$–$C_4$)-alkylamino and/or methylenedioxy, or 3-indolyl,

and its physiologically acceptable salts.

**9.** A compound of the formula IIIa



or IIIb,



in which W denotes hydrogen or a group esterifying carboxyl, and the mixture of its stereoisomers.

**11.** A method of treating hypertension by administering an effective amount of a compound according to claim **1** or a pharmaceutically acceptable salt thereof.

**4,591,599**

## PERFLUOROPYRROLIZINES AND EMULSIONS THEREOF USEFUL AS BLOOD SUBSTITUTES

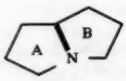
**Kazumasa Yokoyama, Toyonaka; Chikara Fukaya, Osaka; Yoshio Tsuda, Takarazuka; Taizo Ono, Osaka; Yoshio Arakawa, Suita, and Tadakazu Suyama, Kyoto, all of Japan, assignors to The Green Cross Corporation, Osaka, Japan**

**Division of Ser. No. 454,108, Dec. 28, 1982, Pat. No. 4,526,969. This application Nov. 13, 1984, Ser. No. 670,971**

**Int. Cl.[4] C07D *487/06;* A61K *31/40***

**U.S. Cl. 514—413** **4 Claims**

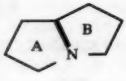
**1.** A perfluoropyrrolizine compound of the formula:



in which either the A ring, the B ring, or both are substituted with at least one $C_1$ to $C_3$ perfluoroalkyl group provided that the total number of carbon atoms in the perfluoropyrrolizine compound is from 8 to 12.

**3.** An emulsion useful as a blood substitute containing a perfluorobicyclo compound capable of carrying oxygen, said emulsion comprising:

5–50% (w/v) of a perfluoropyrrolizine compound of the formula:



in which the A ring, the B ring, or both are substituted with at least one $C_1$ to $C_3$ perfluoroalkyl group provided that the total number of carbon atoms in the perfluoropyrrolizine compound is from 8 to 12,

as an oxygen-carrying component;

1–5% (w/v) of an emulsifying agent, and

a physiologically acceptable aqueous solution as the balance, the emulsion having a particle diameter of 0.3$\mu$ or less.

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**4,591,600**

## 3-HYDROXYFLAVONES: THEIR PREPARATION AND THERAPEUTIC APPLICATION

**Marie-Helene Creuzet, Bordeaux; Claude Feniou, Pessac; Francoise Guichard, Bordeaux; Gisele Prat, Talence; Jacqueline Mosser, Saint-Medard-En-Jalles, and Henri Pontagnier, Pessac, all of France, assignors to Societe Cortial, S.A., Paris, France**

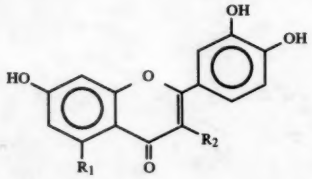
**Filed Mar. 29, 1984, Ser. No. 594,976**

**Claims priority, application France, Apr. 1, 1983, 83 05567**

**Int. Cl.[4] A61K *31/35;* C07D *311/32***

**U.S. Cl. 514—456** **10 Claims**

**1.** A compound of the formula



where $R_1$ is H or OH and $R_2$ is a lower alkoxy of $C_2$ to $C_6$, a cycloalkoxy of $C_5$ to $C_8$, methanesulfonyloxy or paratoluenesulfonyloxy, and $R_1$ is not OH if $R_2$ is a lower alkoxy of $C_2$ to $C_4$.

**6.** A pharmaceutical composition for the lowering of blood sugar, comprising a hypoglycemic effective amount of the compound of claim **1**.

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**4,591,601**

## ANTICONVULSANT DIOXOLANE METHANE SULFAMATES

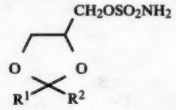
**Bruce E. Maryanoff, New Hope, and Samuel O. Nortey, Lamott, both of Pa., assignors to McNeilab, Inc., Fort Washington, Pa.**

**Filed Apr. 12, 1985, Ser. No. 722,869**

**Int. Cl.[4] A61K *31/335;* C07D *319/00, 317/00***

**U.S. Cl. 514—462** **21 Claims**

**1.** A sulfamate of the following formula (I):



(I)

wherein

$R^1$ and $R^2$ are alkyl or taken together are joined to form a cycloalkyl ring.

**10.** A pharmaceutical composition for the treatment of convulsions comprising an anti-convulsion effective amount of a sulfamate of claim **1** and a pharmaceutically-acceptable carrier.

**12.** A method for the treatment of convulsions in a mammal which comprises administering to the mammal, an anti-convulsion effective amount of the pharmaceutical composition of claim **10**.

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**4,591,602**

## OZONIDE ESTERS AND TOPICAL COMPOSITIONS CONTAINING SAME

**Richard L. De Villez, New Braunfels, Tex., assignor to James H. Brown, Scottsdale, Ariz.**

**Continuation-in-part of Ser. No. 369,163, Apr. 16, 1982, Pat. No. 4,451,480. This application Apr. 18, 1984, Ser. No. 601,537**

**The portion of the term of this patent subsequent to May 29, 2001, has been disclaimed.**

**Int. Cl.[4] A61K *31/335***

**U.S. Cl. 514—463** **8 Claims**

**1.** Jojoba ozonide of refractive index $n^{46°} = 1.4540$.

**3.** Composition for the control of microbial infections which comprise an effective amount of the jojoba ozonide according to claim **1** in an anhydrous vehicle.

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**4,591,603**

## 7-OXABICYCLOHEPTANE SUBSTITUTED PROSTAGLANDIN ANALOGS USEFUL IN THE TREATMENT OF THROMBOTIC DISEASE

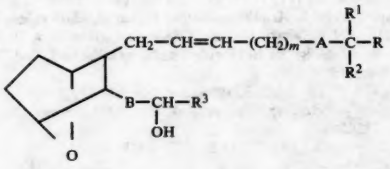
**Jagabandhu Das, Plainsboro, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Feb. 25, 1985, Ser. No. 705,277**

**Int. Cl.[4] A61K *31/34;* C07D *307/00***

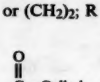
**U.S. Cl. 514—469** **10 Claims**

**1.** A compound having the structural formula



and including all stereoisomers thereof;

wherein A is sulfur or oxygen; m is 1 to 5; B is —CH=CH— or $(CH_2)_2$; R is $-CH_2OH$,



or $CO_2H$; $R^1$ and $R^2$ may be the same or different and are hydrogen or lower alkyl; and $R_3$ is lower alkyl, aryl, aralkyl, cycloalkyl, cycloalkylalkyl or lower alkenyl, wherein the term lower alkyl or alkyl by itself or as part of another group contains 1 to 12 carbons and is unsubstituted or substituted with halo, trifluoromethyl, alkoxy, aryl, alkyl-aryl, haloaryl, cycloalkyl or alkylcycloalkyl;

The term aryl by itself or as part of another group refers to monocyclic or bicyclic aromatic groups containing 6 to 10 carbons in the ring portion and is unsubstituted or substituted with 1 or 2 lower alkyl groups, 1 or 2 halogens and/or 1 or 2 lower alkoxy groups;

the term cycloalkyl by itself or as part of another group contains 3 to 12 carbons and is unsubstituted or substituted with 1 or 2 halogens, 1 or 2 lower alkyl groups and/or 1 or 2 lower alkoxy groups and;

the term lower alkenyl by itself or as part of another group contains from 2 to 12 carbons.

9. A method of inhibiting platelet aggregation, inhibiting bronchoconstriction or treating peripheral vascular disease, which comprises administering to a mammalian host an effective amount of a compound as defined in claim 1 or a pharmaceutically acceptable salt thereof.

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4,591,604

## METHOD OF INHIBITING THE COMPLEMENT SYSTEM BY ADMINISTERING MULTISULFONATED NAPHTHALENE UREAS

**Ransom B. Conrow, Pearl River, and Seymour Bernstein, New City, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.**

**Division of Ser. No. 594,447, Mar. 28, 1984, which is a continuation-in-part of Ser. No. 413,938, Sep. 1, 1982, abandoned, which is a continuation-in-part of Ser. No. 334,941, Dec. 28, 1981, abandoned. This application Aug. 27, 1984, Ser. No. 644,609**

**Int. Cl.[4] A61K *31/185***

**U.S. Cl. 514—577** **15 Claims**

1. A method of inhibiting the complement system in a warm-blooded animal which comprises administering orally, topically, periodontally in the oral cavity, intra-articularly or parenterally to said warm-blooded animal an effective complement-imhibiting amount of the compound 3,3'-ureylenedi-2,7-naphthalenedisulfonic acid, tetrasodium salt.

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4,591,605

## METHOD AND INGESTIBLE FORMULATION FOR INHIBITING THE SECRETION OF STOMACH ACID

**Tushar K. Ray, Dewitt, N.Y., assignor to Research Foundation of State University of New York, Albany, N.Y.**

**Continuation-in-part of Ser. No. 319,929, Nov. 10, 1981, abandoned. This application Oct. 29, 1982, Ser. No. 437,847**

**Int. Cl.[4] A61K *31/13***

**U.S. Cl. 514—579** **7 Claims**

1. An ingestible suspension containing from about 50 to about 500 milligrams per teaspoon of a compound selected from the group consisting of spermine and derivatives thereof and having a molecular weight below 1200, at least 10% of the molecular weight of the compound being due to the molecular weight contribution of secondary amine nitrogen, which interferes with the stomach acid secretion mechanism without permeating the stomach lining.

4,591,606

## POLYOLEFIN FOAM FOAMED WITH WATER AND CROSS-LINKED WITH SILANE, AND PROCEDURE FOR ITS MANUFACTURING

**Christer Bergström, Helsinki, Finland, assignor to Neste Oy, Finland**

**PCT No. PCT/FI84/00079, § 371 Date May 22, 1985, § 102(e) Date May 22, 1985, PCT Pub. No. WO85/01944, PCT Pub. Date May 9, 1985**

**PCT Filed Oct. 24, 1984, Ser. No. 740,843**

**Claims priority, application Finland, Nov. 4, 1983, 834062**

**Int. Cl.[4] C08J *9/12***

**U.S. Cl. 521—79** **7 Claims**

1. A method of producing a foamed polyolefin resin cross-linked with silane, comprising the steps of

forming a mixture of polyolefin, a silane hydrolyzable with water, and a foaming agent consisting essentially of about 0.1–5% water and up to about 20% of a water carrier substance, said percentages being based on the polyolefin, and

extruding the thus-formed mixture, whereby polyolefin cross-linked with silane is formed and is foamed solely by the action of the water which acts as the foaming agent.

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4,591,607

## GRAFT COPOLYMERS OF PARA-METHYLSTYRENE ON POLYOLS AND POLYURETHANES PREPARED THEREFROM

**Gregory A. Campbell, Stockton, N.J., and Carl G. Seefried, Jr., Southbury, Conn., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Dec. 24, 1984, Ser. No. 685,585**

**Int. Cl.[4] C08G *18/14, 18/63;* C08K *5/06***

**U.S. Cl. 521—137** **6 Claims**

1. A polymer polyol product suitable for reaction with an isocyanate to form a polyurethane comprising the reaction product prepared under free-radical conditions from:

(a) a minor proportion of a monomer comprising at least 85 weight percent para-methylstyrene; and

(b) a major proportion of a polyol containing sites for grafting of said p-methylstyrene under said reaction conditions.

6. A polyurethane composition comprising the reaction product of the polymer polyol of claim 1 and a polyisocyanate.

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4,591,608

## ULTRAVIOLET-CURABLE ORGANOPOLYSILOXANE COMPOSITION

**Hiroshige Okinoshima, Gunma, Japan, assignor to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**

**Filed Nov. 15, 1984, Ser. No. 671,697**

**Claims priority, application Japan, Nov. 25, 1983, 58-221843**

**Int. Cl.[4] C08F *2/50, 30/08***

**U.S. Cl. 522—13** **7 Claims**

1. An organopolysiloxane composition curable by irradiation with ultraviolet light which comprises:

(a) 100 parts by weight of an organopolysiloxane having a substantially linear molecular chain structure and containing ethylenically unsaturated monovalent hydrocarbon groups at least at both molecular chain ends as represented by the general formula

$$[CH_2{=}CH{+}CH_2{\rangle}_m]_aR^1{}_{3-a}Si{-}O{+}SiR^2{}_2{-}O{\rangle}_n SiR^1{}_{3-a}[{+}CH_2{\rangle}_m CH{=}CH_2]_a,$$

in which $R^1$ is a substituted or unsubstituted monovalent hydrocarbon group having no aliphatic unsaturation, $R^2$ is a substituted or unsubstituted monovalent hydrocarbon group, the suffix m is zero or a positive integer not exceeding 4, a is 1, 2 or 3 and n is zero or a positive integer not exceeding 10,000;

(b) from 0.1 to 10 parts by weight of an organic peroxide; and

(c) from 0.1 to 5 parts by weight of an aromatic ketone compound as a photosensitizer.

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**4,591,609**

## METHOD FOR PRODUCING WATER-DISPERSIBLE COMPOSITIONS

**Akira Kubo, Sakura; Kan Nishizaki, Ichihara, and Yasuomi Okado, Narashino, all of Japan, assignors to Shinto Paint Co., Ltd., Amagasaki, Japan**

**Filed May 30, 1985, Ser. No. 740,057**

**Claims priority, application Japan, May 31, 1984, 59-112461**

**Int. Cl.[4] C08J** *3/06*

**U.S. Cl. 523—336** **3 Claims**

1. In a method for producing water-dispersible compositions in which an organo-synthetic resin has been dispersed in water in the form of fine particles, a method for producing water-dispersible compositions characterized in that an organo-synthetic resin having a softening point of not less than 65° C. is uniformly heating-mixed with a surface active agent, the mixture obtained is then uniformly mixed with water with stirring while maintaining a temperature above the phase inversion temperature, and the resulting system comprising said resin, surface active agent and water is cooled below the phase inversion temperature to bring about phase inversion in the system, whereby said resin is dispersed in water in the form of fine particles (the phase inversion temperature shall be a temperature higher than 30° C. below the softening point of the organo-synthetic resin but lower than the said softening point).

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**4,591,610**

## THICKENED OR GELLED COMPOSITION FOR CONDITIONING HAIR

**Jean F. Grollier, Paris, France, assignor to L'Oreal, Paris, France**

**Filed Mar. 23, 1984, Ser. No. 592,934**

**Claims priority, application Luxembourg, Mar. 23, 1983, 84708**

**Int. Cl.[4] A45D** *7/00*

**U.S. Cl. 524—55** **21 Claims**

1. A composition suitable for application to the hair which is in the form of a thickened, stable and homogeneous lotion containing either at least one cationic polymer and at least one anionic or amphoteric polymer or at least one anionic polymer and at least one cationic or amphoteric polymer and at least one xanthan gum.

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**4,591,611**

## IONOMERIC POLYMER COMPOSITIONS

**Robert F. Jenkins, Wakefield, and Bahram Siadat, Boxboro, both of Mass., assignors to W. R. Grace & Co., Cambridge, Mass.**

**Filed Sep. 20, 1984, Ser. No. 652,399**

**Int. Cl.[4] C08K** *3/34;* **C08L** *95/00*

**U.S. Cl. 524—64** **25 Claims**

1. A composition comprising an ionomeric polymer and about 5 to about 125 parts by weight of gilsonite, per 100 parts by weight of said polymer.

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**4,591,612**

## CROSS-LINKABLE COMPOSITIONS CONTAINING NON-NEWTONIAN COLLOIDAL DISPERSE SYSTEMS

**Robert E. Quinn, Cleveland, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio**

**Filed Feb. 11, 1985, Ser. No. 700,359**

**Int. Cl.[4] C08K** *3/26*

**U.S. Cl. 524—425** **41 Claims**

1. A composition comprising:

(A) a non-Newtonian colloidal disperse system characterized by a neutralization base number of about 3 or less, said system comprising

(1) solid metal containing colloidal particles predispersed in

(2) a liquid dispersing medium, and

(3) as a third component, at least one organic compound which is soluble in said dispersing medium, the molecules of said organic compound being characterized by a hydrophobic portion and at least one polar substituent; and

(B) an isocyanate-free polymeric cross-linked material formed as a result of reacting a plurality of cross-linkable polymeric polyfunctional materials.

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**4,591,613**

## HYDROXYALKYL MELAMINE CONTAINING RESINS AND THEIR USE IN HEAT AND PRESSURE CONSOLIDATED LAMINATES

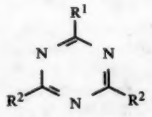
**Fouad T. Karam, Brossard, and Jack I. Sibalis, St. Lambert, both of Canada, assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Apr. 26, 1985, Ser. No. 727,952**

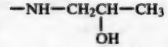
**Int. Cl.[4] C08L** *61/22*

**U.S. Cl. 524—597** **4 Claims**

1. A method for the production of a laminating resin which comprises simultaneously reacting, in the presence of water, (1) a hydroxyalkyl melamine having the formula



wherein $R^1$ is a $C_1$–$C_8$ linear or branched chain alkyl group, a $C_6$–$C_{10}$ aryl group or $R^2$ and $R^2$ is —$NH_2$, —$NH(CH_2)_xOH$ or



wherein x is 3–8, inclusive, and at least one $R^2$ is a hydroxyalkyl group, (2) formaldehyde and (3) melamine, the molar ratio of (2) to (3) ranging from about 1.2:1 to 2.0:1, respectively, and the molar ratio of (1) to (3) ranging from about 0.03 to 1 to 0.15 to 1, respectively, at a pH ranging from about 8–11, at a temperature ranging from about 95° C. to 105° C. under atmospheric pressure or under superatmospheric pressure at about 110°–130° C., for from about 15 to 45 minutes, and in the presence of a condensation catalyst and reducing the temperature to about 70° to 90° C. under atmospheric pressure until a water tolerance of from about 200 to 600 is reached.

4,591,614

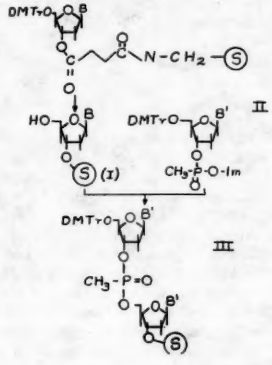
## PREPARATION OF OLIGODEOXYRIBONUCLEOSIDE ALKYL OR ARYLPHOSPHONATES

Paul S. Miller, Baltimore, and Paul O. P. T'so, Lutherville, both of Md., assignors to The Johns Hopkins University, Baltimore, Md.

Continuation-in-part of Ser. No. 540,185, Oct. 7, 1983, Pat. No. 4,507,433. This application Apr. 30, 1984, Ser. No. 605,451

Int. Cl.[4] C07H *19/10, 21/02, 21/04*

U.S. Cl. 525—54.11 14 Claims



1. A 5'-protected nucleoside-3'-alkyl or arylphosphonic imidazolide or other azole derivative.

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4,591,615

## THERMOPLASTIC ELASTOMER COMPOSITION

Alan C. G. Aldred, North Cheam, and Sidney G. Fogg, Ashtead, both of England, assignors to The British Petroleum Company p.l.c., London, England

Filed Feb. 20, 1985, Ser. No. 703,433

Claims priority, application United Kingdom, Feb. 28, 1984, 8405190

Int. Cl.[4] C08L *77/00, 23/26, 9/02*

U.S. Cl. 525—179 9 Claims

1. A process for producing a thermoplastic elastomer comprising curing a blend of nitrile rubber and a thermoplastic under dynamic curing conditions characterized in that the blend comprises (A) a nitrile rubber, (B) a copolymer comprising ethylene and an acrylic or methacrylic ester and (C) a peroxy curing agent and in that both the rubber and the copolymer are cured by mixing at a temperature above the activation temperature of the peroxy curing agent and above the melting temperature of the ethylene(meth) acrylate copolymer.

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4,591,616

## OPTICAL PLASTICS MATERIAL USING METHACRYLIC RESIN AND FLUOROCOPOLYMER

Seizo Miyata, and Satoru Kobayashi, both of Tokyo, Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Aug. 22, 1985, Ser. No. 768,051

Claims priority, application Japan, Aug. 30, 1984, 59-179175

Int. Cl.[4] C08L *27/16, 33/08, 33/10*

U.S. Cl. 525—185 9 Claims

1. An optical plastics material consisting essentially of a blend of a methyl methacrylate base polymer with a copolymer of vinylidene fluoride and hexafluoroacetone.

4,591,617

## CROSSLINKING COMPOSITION FOR BUTYL RUBBER OR HALOBUTYL RUBBER AND EPIHALOHYDRIN RUBBER BLENDS

Dominic A. Berta, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Jan. 14, 1985, Ser. No. 691,334

Int. Cl.[4] C08L *71/02*

U.S. Cl. 525—187 22 Claims

1. A cross-linking composition for crosslinking a blend from about 140° C. to about 260° C. from about 5 seconds to 10 hours of (A) halobutyl rubber or a mixture of butyl rubber and halobutyl rubber wherein at least 50% by weight of the mixture is halobutyl rubber and (B) an epichlorohydrin rubber consisting essentially of, for each 100 parts by weight of the rubber blend;

(a) from about 1.0 parts to about 20 parts of a sulfur curative system consisting essentially of (i) sulfur, (ii) an accelerator, and (iii) a zinc oxide promotor; and

(b) from about 0.3 parts to about 10 parts of a nonsulfur curative system consisting essentially of (i) a non-sulfur curative selected from the group consisting of di- and tri-functional mercapto compounds and derivatives thereof; and (ii) a metal compound promotor selected from the group consisting of oxides, hydroxides, and carbonates of metals in Groups Ia and IIa.

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4,591,618

## ANAEROBIC ADHESIVE COMPOSITION COMPRISING MODIFIED UNSATURATED POLYMER AND (METH)ACRYLIC ACID

Kazuo Naito, Kawasaki; Tadashi Fuse, Higashimurayama; Itsuo Tanuma, Tokorozawa; Yukio Fukuura, Kawagoe, and Hikaru Ishikawa, Kokubunji, all of Japan, assignors to Bridgestone Tire Co., Ltd., Tokyo, Japan

PCT No. PCT/JP82/00279, § 371 Date Mar. 18, 1983, § 102(e) Date Mar. 18, 1983, PCT Pub. No. WO83/00341, PCT Pub. Date Feb. 3, 1983

PCT Filed Jul. 20, 1982, Ser. No. 476,970

Claims priority, application Japan, Jul. 20, 1981, 56-112209

Int. Cl.[4] C08F *271/02, 277/00, 259/02*

U.S. Cl. 525—279 18 Claims

1. An anaerobic adhesive composition, comprising:

10 to 90 parts by weight per 100 parts by weight of the composition of a polymer having a polymerizable side chain and a molecular weight of at least 500 which is a product obtained by reacting a material having a carbon-to-carbon unsaturated double bond and a molecular weight of at least 500 with a polymerizable unsaturated monomer selected from the group consisting of methacrylic acid, acrylic acid and a mixture thereof in the presence of an alkyl hypohalite or an N-haloamide compound represented by the general formula:

wherein X represents a halogen atom, A represents a carboxylic acid residue, sulfonic acid residue or carbonic acid monoester, and B represents a hydrogen atom, halogen atom or carboxylic acid residue so that a methacryloyloxy or acryloyloxy group is present in an amount of 1/200 to 1/3000 molar equlvalent based on the unit weight of the material having a carbon-to-carbon unsaturated double bond and a molecular weight of at least 500;

4 to 80 parts by weight per 100 parts by weight of the final adhesive composition of an organic acid selected from the group consisting of methacrylic acid, acrylic acid and a mixture thereof; and

an organic peroxide polymerization catalyst, said adhesive

composition having a sheer bond strength to mild steel of at least 110 kg/cm$^2$.

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4,591,619

## PROCESS FOR PRODUCING AN IMINATED COPOLYMER

Tomoyuki Kitsunai; Kiyotaka Saito, both of Machida, and Shozo Hori, Ayase, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 385,203, Jun. 4, 1982, Pat. No. 4,504,625.
This application Dec. 21, 1984, Ser. No. 684,552
Claims priority, application Japan, Dec. 11, 1981, 56-199720; Apr. 23, 1982, 57-68174
Int. Cl.$^4$ C08L *21/00, 51/04*
U.S. Cl. 525—285 12 Claims

1. A process for producing an iminated copolymer which comprises reacting in the presence of a tertiary amine at a temperature of 80° to 350° a nitrogen compound selected from the group consisting of ammonia and a primary amine with a graft copolymerization product obtained by graft-copolymerizing 3 to 40 wt % of a rubber-like polymer, the content of gel in said rubber-like polymer being not more than 5% by weight and the glass transition temperature thereof being below −(minus) 20° C., with 60 to 97 wt % of a monomer mixture consisting essentially of 50 to 95 wt % of an aromatic vinyl monomer, 5 to 50 wt % of an unsaturated dicarboxylic acid anhydride and 0 to 30 wt % of a vinyl monomer copolymerizable with said aromatic vinyl monomer and said unsaturated dicarboxylic acid anhydride, the molar ratio of the nitrogen compound to the unsaturated dicarboxylic acid anhydride contained in said graft copolymerization product being at least 1.

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4,591,620

## COPOLYMER, A FILM FORMING COMPOSITION AND A METHOD OF COATING A SURFACE WITH THE COMPOSITION

Sidney G. Fogg, Ashtead, and Frank C. Robertson, Woking, both of England, assignors to The British Petroleum Company p.l.c., London, England

Filed May 12, 1983, Ser. No. 494,008
Claims priority, application United Kingdom, May 26, 1982, 8215395; Oct. 21, 1982, 8230073
Int. Cl.$^4$ C08F *8/30*
U.S. Cl. 525—328.8 9 Claims

1. An acrylic copolymer containing hydrazide groups comprising the reaction product of (a) a copolymer formed by polymerising a mixture comprising esters of unsaturated carboxylic acids and (b) hydrazine wherein the mixture of esters comprises a major proportion of monomer units which are methyl acrylate or methyl methacrylate and a minor proportion of co-monomer units which are one or more alkyl esters of crylic acid or methacrylic acid in which the alkyl group comprises at least four carbon atoms and wherein the copolymer is reacted with the hydrazine in the presence of water.

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4,591,621

## CHLORINATED POLYETHYLENE ELASTOMERS

Royce E. Ennis, Beaumont, Tex., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 29, 1983, Ser. No. 518,744
Int. Cl.$^4$ C08F *8/34*
U.S. Cl. 525—344 6 Claims

1. In a process for making an uncured chlorosulfonated polyolefin elastomer which comprises mixing polyethylene with chlorine or a chlorine-generating material in the presence of sulfur dioxide or sulfuryl chloride at elevated temperatures, the improvement which comprises said polyethylene having a flow rate of about 1–8 grams per 10 minutes as determined by ASTM D 1238 Condition E, and a molecular weight distribution of about 6–13 as determined by the ratio of $\overline{M}w/\overline{M}n$ where $\overline{M}w$ represents the weight average molecular weight and $\overline{M}n$ represents the number average molecular weight and adding to the polyethylene an amount of chlorine or chlorine-generating material sufficient to incorporate into the polyethylene about 20–28% by weight chlorine.

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4,591,622

## SILICONE PRESSURE-SENSITIVE ADHESIVE PROCESS AND PRODUCT THEREOF

John D. Blizzard, Bay City, and Terence J. Swihart, Essexville, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Oct. 29, 1984, Ser. No. 665,797
Int. Cl.$^4$ C08L *83/06*
U.S. Cl. 525—477 34 Claims

1. A method of making a silicone pressure-sensitive adhesive composition possessing improved stability upon aging which comprises the steps of:

(I) mixing

(A) from 40 to 70 inclusive parts by weight of at least one benzene-soluble resin copolymer containing silicon-bonded hydroxyl radicals and consisting essentially of $R_3SiO_{\frac{1}{2}}$ units and $SiO_{4/2}$ units in a mole ratio of from 0.6 to 0.9 $R_3SiO_{\frac{1}{2}}$ units for each $SiO_{4/2}$ unit present,

(B) from 30 to 60 parts by weight of at least one polydiorganosiloxane consisting essentially of $ARSiO$ units terminated with endblocking $TRASiO_{\frac{1}{2}}$ units, each said polydiorganosiloxane having a viscosity of from 100 centipoise to 30,000,000 centipoise at 25° C., and each T is R— or X—,

(C) a sufficient amount of at least one organosilicon endblocking agent capable of generating an endblocking triorganosilyl unit selected from the group consisting of $ZR_2Si$— units, $CH_3Z'$—units, $RZ''$— units and $Z'''R_2Si$ units to provide a 1:0.8 to 1:3 mole ratio of total silicon-bonded hydroxyl and X radicals present in said (A) and (B) to total endblocking triorganosilyl units provided by all endblocking agent present, said agent being selected from the group consisting of $ZR_2SiY$, $(ZR_2Si)_2D$, $CH_3Z'Y$, $(CH_3Z')_2O$, $RZ''Y'$, $(RZ'')_2O$ and $Z'''R_2SiY'$,

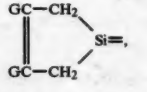
(D) optionally, an additional catalytic amount of a mild silanol condensation catalyst, and

(E) when necessary, an effective amount of an organic solvent which is inert with respect to (A), (B), (C), and (D) to reduce the viscosity of a mixture of (A), (B), (C), and (D), and

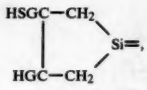
(II) condensing the mixture of (A), (B), (C) and (D) at least until a substantial amount of the endblocking triorganosilyl units have reacted with the silicon-bonded hydroxyl radicals and X radicals of said (A) and (B),

wherein each R is a monovalent organic radical selected from the group consisting of hydrocarbon radicals of from 1 to 6 inclusive carbon atoms, each X radical is selected from the group consisting of HO—, H— and R'O— radicals, each R' is an alkyl radical of from 1 to 4 inclusive carbon atoms, each Y radical is a monovalent hydrolyzable organic radical or HO—, each Y' is HO— or a monovalent hydrolyzable organic radical free of nitrogen, each A radical is selected from the group consisting of R— and halohydrocarbon radicals of from 1 to 6 inclusive carbon atoms, each Z radical is A— or QR''—, each R'' is a divalent alkylene radical of from 1 to 6 inclusive carbon atoms, each Q is an organofunctional monovalent radical selected from the group consisting of RCOE', RE'OC—, NC—, R'E'—, HO—, $G_2N$—, $HO(R''O)_n$—, and $G_2NCH_2CH_2NG$—, where E' is —O—, —NG— or —S—, n has a value of from 1 to 6,

Z' is



Z'' is



Z''' is selected from the group consisting of HSR''—, $HSCH_2CH_2NGR''$— and $HOCH_2CH_2SR''$— radicals, each G is R— or H—, D is a divalent or trivalent radical capable of being hydrolyzed to release said endblocking silyl units and q has a value of 2 when D is a divalent radical and q has a value of 3 when D is a trivalent radical.

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**4,591,623**

## THERMOSETTING RESIN COMPOSITION

**Hiroyuki Nakajima, Suita; Fumiyuki Miyamoto, Itami; Masakazu Murayama, Takatsuki; Seiji Oka, Amagasaki, and Eiki Jidai, Toyonaka, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 12, 1985, Ser. No. 743,896**

**Claims priority, application Japan, Jun. 15, 1984, 59-124137**

**Int. Cl.[4] C08L** *63/02*

**U.S. Cl. 525—524** **3 Claims**

1. A thermosetting resin composition, which is characterized by mixing 5 to 300 parts by weight of tri-functional vinyl monomer and 0.1 to 10 parts by weight of phenoxy resin with respect to 100 parts by weight in total of an epoxy compound containing in its molecule at least two epoxy groups and a curing agent for said epoxy compound.

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**4,591,624**

## CATALYST SYSTEM AND PROCESS FOR POLYMERIZING CONJUGATED DIENES

**James E. Hall, Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio**

**Division of Ser. No. 627,246, Jul. 2, 1984, Pat. No. 4,520,123. This application Mar. 18, 1985, Ser. No. 712,596**

**Int. Cl.[4] C08F** *4/48, 36/04*

**U.S. Cl. 526—177** **21 Claims**

1. A process for polymerizing conjugated diene monomers to polymers having increased amounts of 1,2-structure which comprises the use of a catalyst system comprising

(a) at least one anionic initiator based on lithium, and

(b) a modifier composition comprising at least one cyclic acetal of a glyoxal.

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**4,591,625**

## MONOMER AND POLYMERS CONTAINING 4-AMINOPYRIDINE

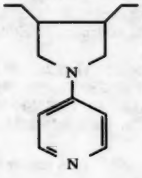
**Lon J. Mathias, Hattiesburg, Miss., assignor to University of Southern Mississippi, Hattiesburg, Miss.**

**Filed Nov. 26, 1984, Ser. No. 674,740**

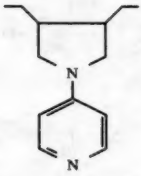
**Int. Cl.[4] C08F** *26/02, 26/06*

**U.S. Cl. 526—265** **8 Claims**

1. A homopolymer of 4-(diallylamino)pyridine having repeating units of the formula



2. A copolymer of 4-(diallylamino)pyridine and at least one other ethylenically unsaturated comonomer, said copolymer having repeat units of the formula



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**4,591,626**

## POLYMERS OF TRICYCLO[5.2.1.0$^{2,6}$]DECA-8-YL (METH)ACRYLATE

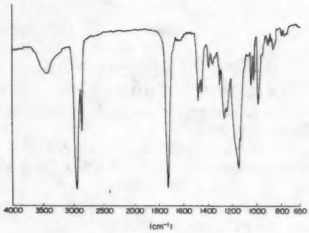
**Hiromasa Kawai; Takashi Morinaga; Hiromu Miyajima; Toshio Akima; Mitsuharu Kato, and Yutaka Hosoi, all of Ichihara, Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan**

**Filed Oct. 23, 1984, Ser. No. 663,974**

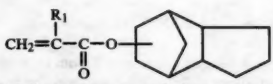
**Claims priority, application Japan, Oct. 24, 1983, 58-198743; Nov. 1, 1983, 58-205601; Sep. 20, 1984, 59-197596**

**Int. Cl.[4] L08F** *32/08*

**U.S. Cl. 526—282** **6 Claims**




1. A transparent material for optical elements comprising a polymer produced by polymerizing a compound of the formula:



(I)

wherein $R_1$ is hydrogen or a methyl group, in an amount of 100 to 5% by weight and one or more unsaturated monomers copolymerizable with the compound of the formula (I) in an amount of 0 to 95% by weight; said material exhibiting a saturated water absorption rate of 1.8% or less, and Abbe number of 45 or more and a glass transition point of 100° C. or higher.

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**4,591,627**

## OPTICAL ADHESIVE COMPOSITION

**Tooru Maruno, Hino; Kouzaburou Nakamura, Tokyo, and Shigekuni Sasaki, Iruma, all of Japan, assignors to Nippon Telegraph & Telephone Public Corporation, Tokyo, Japan**

**Filed Sep. 6, 1984, Ser. No. 647,637**

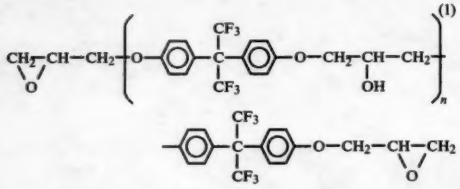
**Claims priority, application Japan, Sep. 9, 1983, 58-165268; Nov. 21, 1983, 58-217794; Nov. 29, 1983, 58-223087; Jun. 15, 1984, 59-121914; Jun. 15, 1984, 59-121915; Aug. 9, 1984, 59-167232**

**Int. Cl.[4] C08G** *59/42, 59/30*

**U.S. Cl. 528—103** **6 Claims**

1. An adhesive composition for use in optical members, comprising:

a fluorinated epoxy resin represented by the formula (1):



(1)

wherein n ranges from 0 to 7 including fractional values therebetween;

a reactive diluent selected from the group consisting of glycidyl ethers; and

4-[perfluoro-1,3-dimethyl-2-(1-methylethyl)-1-butenyl]-oxyphathalic anhydride as a hardner.

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**4,591,628**

## PHOTOGRAPHIC PRODUCTS AND PROCESSES

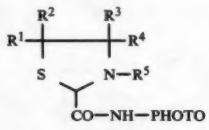
**James W. Foley, Andover, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Division of Ser. No. 500,415, Jun. 2, 1983, Pat. No. 4,466,451. This application Jul. 23, 1984, Ser. No. 633,699**

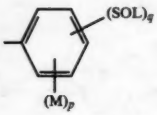
**Int. Cl.[4] C07D 277/04**

**U.S. Cl. 548—146** **2 Claims**

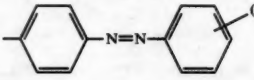
1. A compound of the formula



wherein $R^1$, $R^2$ and $R^3$ each are selected from hydrogen, alkyl, aryl, aralkyl and alkaryl; $R^4$ is selected from hydrogen, carboxy, N,N-dialkylcarboxamido, alkyl, aryl, aralkyl and alkaryl; $R^5$ is selected from alkyl, aryl, alkaryl and aralkyl; and PHOTO is

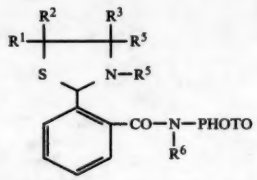


or

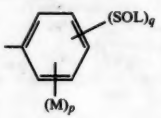


wherein SOL is carboxy, hydroxy or sulfo; M is $NO_2$or an amino group; p is an integer 0 or 1; and q is an integer 0, 1 or 2.

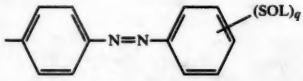
2. A compound of the formula



wherein $R^1$, $R^2$ and $R^3$ each are selected from hydrogen, alkyl, aryl, aralkyl and alkaryl; $R^4$ is selected from hydrogen, carboxy, N,N-dialkylcarboxamido, alkyl, aryl, aralkyl and alkaryl; $R^5$ is selected from alkyl, aryl, alkaryl and aralkyl; $R^6$ is alkyl or aryl; and PHOTO is



or



wherein SOL is carboxy, hydroxy or sulfo; M is $NO_2$ or an amino group; p is an integer 0 or 1; and q is an integer 0, 1 or 2.

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**4,591,629**

## PROCESS FOR THE PURIFICATION OF HIGH MOLECULAR WEIGHT POLYESTERS

**Hussain El-Ghatta; Hans-Werner Philipp; Richard Sailer, and Bruno Domeisen, all of Chur, Switzerland, assignors to EMS-Inventa AG, Zurich, Switzerland**

**Filed Apr. 21, 1983, Ser. No. 487,518**

**Int. Cl.[4] C08G 63/16**

**U.S. Cl. 528—308.2** **17 Claims**

1. A method for reducing the volatile component content of crude high molecular weight polyesters containing said component, which method comprises

first contacting said crude polyester with steam, or a mixture of steam and inert gas and/or air, at a first temperature of 100° to 245° C., to form a partially treated polyester, and

further contacting said partially treated polyester with inert gas and/or air at a second temperature of 200° to 245° C. to produce a purified polyester.

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**4,591,630**

## ANNEALED POLYDIOXANONE SURGICAL DEVICE AND METHOD FOR PRODUCING THE SAME

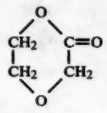
**Arthur Gertzman, Bridgewater, and Darrell R. Thompson, Somerville, both of N.J., assignors to Ethicon, Inc., Somerville, N.J.**

**Division of Ser. No. 436,224, Oct. 25, 1982, abandoned, which is a continuation-in-part of Ser. No. 288,275, Jul. 30, 1981. This application Jun. 10, 1985, Ser. No. 743,111**

**Int. Cl.[4] B29B 17/00; C08G 63/70**

**U.S. Cl. 528—503** **7 Claims**

1. A method of treating a thermally formed, substantially unoriented surgical device made of a polymer prepared from a monomer having the formula



comprising:

(a) drying the thermally formed device at a temperature of less than 30° C. to remove substantially all moisture from the device; and

(b) heating the dried device without any restraint in a dry, inert atmosphere at a temperature of 50° C. to 90° C. for at least 7 hours whereby the strength and functional integrity of the device are improved.

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4,591,631

## SEPARATION OF GUAYULE RUBBER/RESIN EXTRACT FROM GUAYULE BAGASSE BY WATER ADDITION POST-EXTRACTION

**Joanne L. Beattie, Uniontown, and William M. Cole, Norton, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio**

**Filed Sep. 13, 1984, Ser. No. 650,150**

**Int. Cl.⁴ C08C *1/04***

**U.S. Cl. 528—930** **17 Claims**

1. A method for separating bagasse from a guayule source comprising the steps of:

contacting a resin-rubber single phase solvent system containing at least one organic polar solvent and at least one hydrocarbon solvent with the guayule source having the bagasse therein,

the amount of polar organic solvent ranging from about 10 percent to about 35 percent by weight and wherein the amount of said hydrocarbon solvent ranging from about 90 percent to about 65 percent by weight, wherein said polar solvent is selected from the group consisting of a ketone having from 3 to 8 carbon atoms, an ester having from 3 to 8 carbon atoms, an alcohol having from 1 to 8 carbon atoms, and ether having from 2 to 8 carbon atoms and combinations thereof, and wherein said hydrocarbon solvent is selected from the group consisting of an alkane having from 4 to 9 carbon atoms, a cycloalkane or alkyl cycloalkane having from 5 to 10 carbons atoms, an aromatic or alkyl substituted aromatic having from 6 to 12 carbon atoms and combinations thereof:

simultaeously extracting rubber and resin from said guayule source at an ambient temperature and forming a miscella solution; and

adding water to said solution and formng an aqueous phase and a miscella phase whereby said bagasse is separated from said miscella phase.

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4,591,632

## FREEZE COAGULATION PROCESS

**Eugene R. Moore, 5600 Woodview, Midland, Mich. 48640**

**Filed Mar. 19, 1985, Ser. No. 713,671**

**Int. Cl.⁴ C08C *1/14***

**U.S. Cl. 528—481** **11 Claims**

1. A method for freeze coagulation of polymer emulsion comprising:

providing a freezing surface for initiating freeze coagulation of the polymeric material;

coating said freezing surface with a thin film of ice;

exposing a polymer emulsion to said coated, freezing surface;

allowing polymeric material to coagulate on said coated, freezing surface;

separating said ice layer from said freezing surface to thereby separate said coagulated polymeric material from said freezing surface.

4,591,633

## DEODORIZED POLYOLEFINS AND PROCESS FOR THE PREPARATION THEREOF

**Takeshi Suzuki, and Nobutoshi Komori, both of Chibaken, Japan, assignors to Chisso Corporation, Osaka, Japan**

**Continuation of Ser. No. 450,426, Dec. 16, 1982, abandoned. This application Jul. 8, 1985, Ser. No. 752,653**

**Int. Cl.⁴ C08F *6/08***

**U.S. Cl. 528—485** **8 Claims**

1. Deodorized polypropylenes comprising a mixture of

(a) polypropylenes that have been produced with a Ziegler catalyst and which have had the catalyst deactivated with an alkylene oxide and containing zero active chlorine, and

(b) 0.005 to 0.1% by weight of at least one deodorizer selected from the compounds having the following formula 1 to 6:

$$Al_xSi_y(OH)_{3x+4y}\cdot nH_2O \quad (1)$$

$$Mg_x(OH)_{2y-2x}(CO_3).nH_2O \quad (2)$$

$$Mg_xCa_y(CO_3)_{2x+2y/2}.nH_2O \quad (3)$$

$$M_xSi_y(OH)_{2x+4y}.nH_2O \quad (4)$$

$$M_xAl_ySi_z(OH)_{2x+3y+4z}.nH_2O \quad (5)$$

$$M_xAl_y(OH)_{2x+3y-2z}(A).nH_2O \quad (6)$$

where M represents Mg or Ca; A represents $CO_3$, $HPO_4$ or $SO_4$; x, y and z represent a positive number; and n represents zero or a positive integer;

as well as calcined products and hydrates thereof.

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4,591,634

## TRISAZO/AZOXY DYESTUFF MIXTURES

**Karl J. Herd, Cologne, and Horst Nickel, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

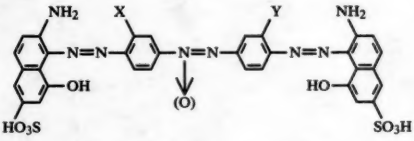
**Continuation of Ser. No. 267,812, May 27, 1981, abandoned. This application Jul. 15, 1985, Ser. No. 755,037**

**Claims priority, application Fed. Rep. of Germany, Jun. 12, 1980, 3021979**

**Int. Cl.⁴ C07C *105/00*; C09B *43/10, 27/00, 46/00***

**U.S. Cl. 534—570** **1 Claim**

1. A trisazo/azoxy dyestuff mixture which in the form of the free acid correspond to the formula



(VI)

and X and Y denote H, $C_1$–$C_4$-alkoxy, chlorine, bromine, $C_1$–$C_4$-alkylsulphony, sulphamyl, mono-$C_1$–$C_4$-alkyl sulphamyl, di-$C_1$–$C_4$-alkyl sulphamyl, carboxyl or carboxy $C_1$–$C_4$-alkoxy.

4,591,635

## SULFO GROUP-FREE POLYAZO COMPOUNDS CONTAINING AT LEAST TWO BASIC WATER-SOLUBILIZING GROUPS IN METAL-FREE OR METAL COMPLEX FORM

Manfred Greve, Dornach, and Helmut Moser, Oberwil, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

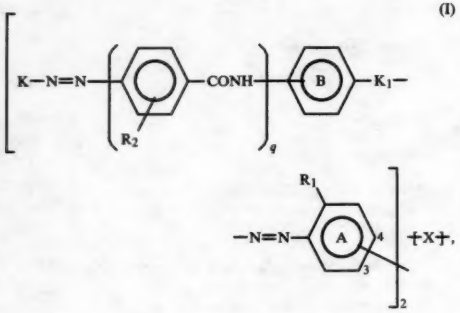
Filed Nov. 10, 1983, Ser. No. 550,862

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1982, 3243092; Feb. 7, 1983, 3304031

Int. Cl.[4] C09B *35/039, 44/02, 44/08;* D06P *1/41*

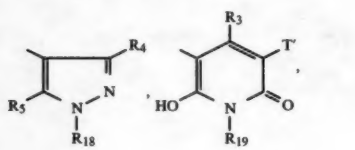
U.S. Cl. 534—612 15 Claims

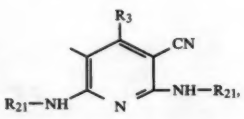
1. A metal-free compound or a 1:1 or 1:2 metal complex of the formula

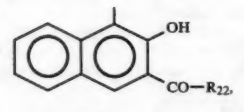


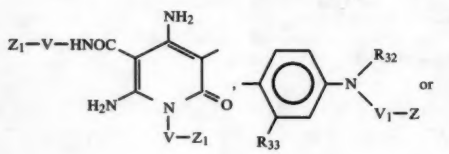
(I)

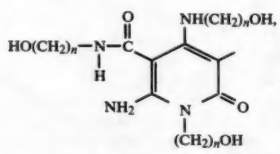
wherein each K is independently











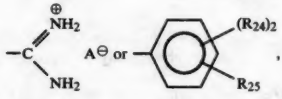
wherein

$R_3$ is hydrogen, $C_{1-4}$alkyl, phenyl or benzyl,

$R_4$ is $C_{1-4}$alkyl, ($C_{1-4}$alkoxy)-carbonyl or —CO—N($R_8$)$_2$,

$R_5$ is amino or hydroxy,

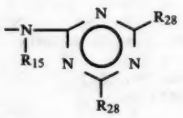
$R_{18}$ is hydrogen, $C_{1-4}$alkyl,



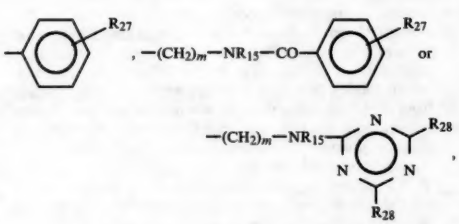
wherein

each $R_{24}$ is independently hydrogen, halo, $C_{1-4}$alkyl, $C_{1-4}$alkoxy, nitro, amino or acetamido, and

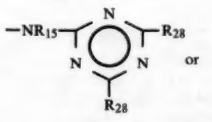
$R_{25}$ is hydrogen, —NH—CO—$(CH_2)_a$—Z, —$SO_2$—NH—$(CH_2)_d$—Z or

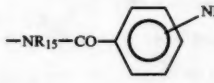


$R_{19}$ is hydrogen, $C_{1-6}$alkyl, amino, methylamino, phenylamino, ($C_{1-4}$alkoxy)$C_{1-4}$alkyl, phenyl-($C_{1-4}$alkyl), —$(CH_2)_d$—CN, —$(CH_2)_d$—OH, —$(CH_2)_m$—Z, —$(CH_2)_m$—NR$_{15}$—CO—$(CH_2)_a$—Z,



wherein $R_{27}$ is hydrogen, amino, methylamino, dimethylamino, diethylamino, acetamido, —NH—CO—$(CH_2)_a$—Z, —$(CH_2)_m$—Z, —$SO_2$—NH—$(CH_2)_m$—Z,





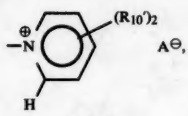
each $R_{21}$ is independently hydrogen, $C_{1-4}$alkyl, alkoxy($C_{1-4}$alkyl), 2-hydroxyethyl or —$(CH_2)_d$—Z,

$R_{22}$ is —NH—$(CH_2)_m$—Z or nitrophenylamino,

$R_{32}$ is hydrogen, —$V_1$—Z, $C_{1-4}$alkyl or $C_{1-4}$hydroxyalkyl, wherein $V_1$ is linear $C_{1-4}$alkylene,

$R_{33}$ is hydrogen, $C_{1-4}$alkyl, ($C_{1-4}$alkyl)carbonylamino or —NH—CO—$V_1$—Z, wherein $V_1$ is linear $C_{1-4}$alkylene,

T′ is hydrogen, cyano, carbamoyl or



wherein each $R_{10}'$ is independently hydrogen, methyl, amino, dimethylamino or carbamoyl,

each V is independently linear $C_{1-12}$-alkylene; linear alkylene having a maximum of 12 carbon atoms interrupted by 1 or 2 members selected from the group consisting of —S—, —O— and $—NR_8—$; $C_{3-12}$-alkenylene or alkenylene having a maximum of 12 carbon atoms interrupted by 1 or 2 members selected from the group consisting of —S—, —O— and $—NR_8—$,

$V_1$ is linear $C_{1-4}$alkylene,

Z is $—N(R_{29})_2$ or $—N^{\oplus}(R_{30})_2R_{31}\ A^{\ominus}$, wherein

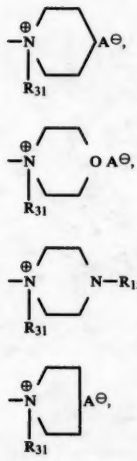
each $R_{29}$ is independently hydrogen; $C_{1-4}$alkyl; phenyl($C_{1-4}$-alkyl) or $C_{2-4}$alkyl mono-substituted by hydroxy, halo or cyano or

$—N(R_{29})_2$ is morpholino, piperidino, pyrrolidino, piperazino or N-methylpiperazino,

each $R_{30}$ is independently $C_{1-4}$alkyl, phenyl($C_{1-4}$-alkyl) or $C_{2-4}$alkyl monosubstituted by hydroxy, halo or cyano, and

$R_{31}$ is $C_{1-4}$alkyl or phenyl($C_{1-4}$-alkyl) or

$—N^{\oplus}(R_{30})_2R_{31}\ A^{\ominus}$ is pyridinium $A^{\ominus}$, picolinium $A^{\ominus}$, lutidinium $A^{\ominus}$,

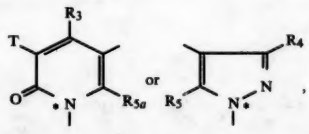


wherein $R_{31}$ is $C_{1-4}$-alkyl or phenyl($C_{1-4}$-alkyl),

each $Z_1$ is independently $—N(R_{29})_2$, $—N^{\oplus}(R_{30})_2R_{31}\ A^{\ominus}$ or hydroxy, wherein $R_{29}$, $R_{30}$ and $R_{31}$ are as defined above, and

each n is independently 1, 2, 3 or 4,

each $K_1$ is independently



wherein

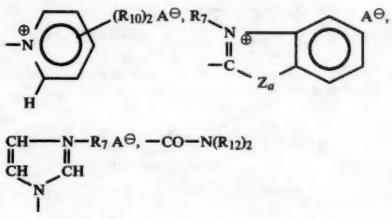
$R_3$ is hydrogen, $C_{1-4}$alkyl, phenyl or benzyl,

$R_4$ is $C_{1-4}$alkyl, ($C_{1-4}$alkoxy)-carbonyl or $—CO—N(R_8)_2$,

$R_5$ is amino or hydroxy,

$R_{5a}$ is hydroxy,

T is hydrogen, cyano,



or ($C_{1-4}$alkyl)carbonyl, wherein

$R_7$ is $C_{1-4}$alkyl,

each $R_{10}$ is independently hydrogen, $C_{1-4}$alkyl, $—N(R_{12})_2$ or $—CO—N(R_{12})_2$, wherein $R_{12}$ is as defined below,

each $R_{12}$ is independently hydrogen, cyclohexyl, $C_{1-4}$alkyl or $C_{1-4}$hydroxyalkyl,

$Z_a$ is —S—, —O— or $—NR_8—$, and

the * denotes the atom attached to Ring B,

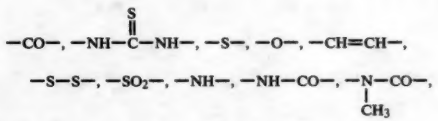
each $R_1$ is independently hydrogen, halo, hydroxy, $C_{1-4}$alkoxy or $C_{1-4}$alkyl, or

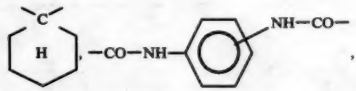
$R_1$ and $R_5$, located on rings attached to the same azo radical, are —O—Me—NH— or —O—Me—O—, wherein Me is a 1:1 or 1:2 metal complex-forming metal ion, or

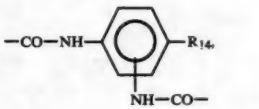
$R_1$ and $R_{5a}$, located on rings attached to the same azo radical, are —O—Me—O—, wherein Me is as defined above,

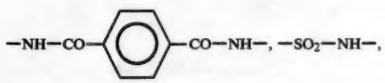
each $R_2$ is independently hydrogen, halo, $C_{1-4}$alkyl or $C_{1-4}$alkoxy,

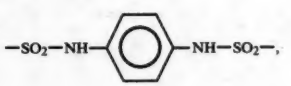
X is a direct bond, linear or branched $C_{1-4}$alkylene,











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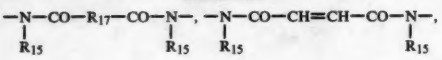

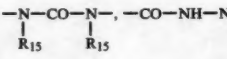

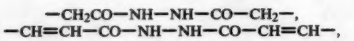

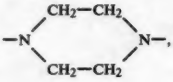

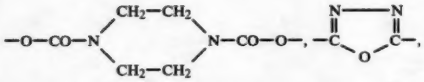

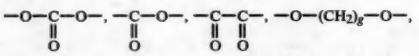

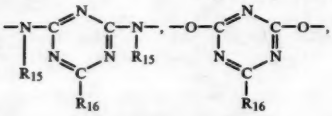

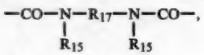

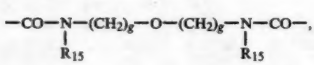

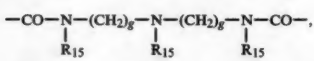

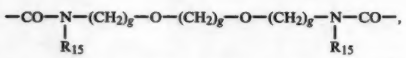

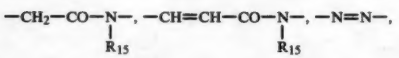

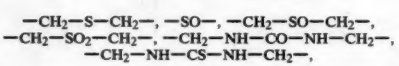

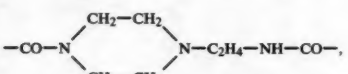

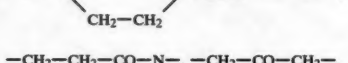

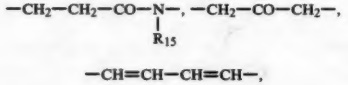

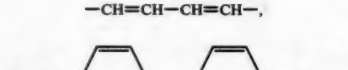

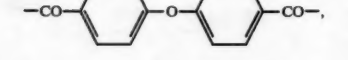





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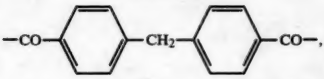

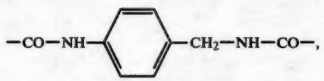

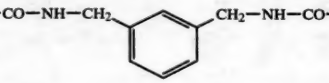

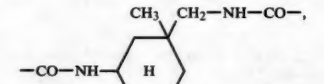

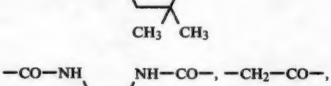

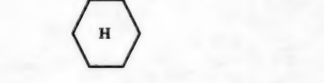

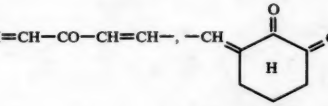

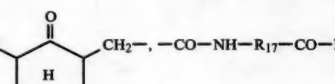

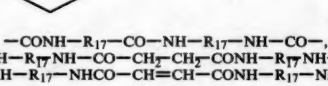

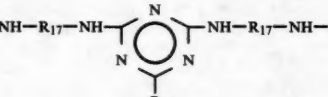

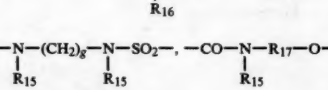

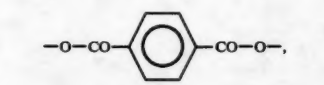

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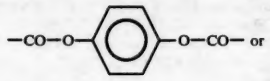


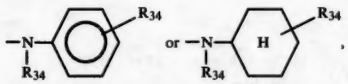
—CONH—$R_{17}$—NHCONH—$R_{17}$—NHCO—,

wherein

$R_{14}$ is halo, $C_{1-4}$alkyl or $C_{1-4}$alkoxy,

each $R_{15}$ is independently hydrogen or $C_{1-4}$alkyl,

$R_{16}$ is halo, hydroxy, amino, —$NR_{34}R_{35}$, N,N-di-(2-hydroxyethyl)amino, —$NR_{34}$—$A_1$—$NR_{34}R_{35}$,



wherein

$A_1$ is linear or branched $C_{1-4}$-alkylene,

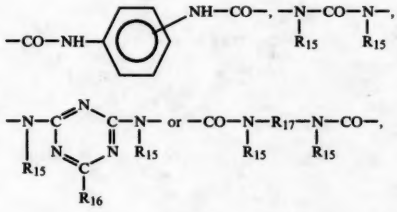
each $R_{34}$ is independently hydrogen or $C_{1-4}$alkyl, and

$R_{35}$ is $C_{1-4}$alkyl or $C_{1-4}$hydroxyalkyl,

each $R_{17}$ is independently linear or branched $C_{1-4}$alkylene, and

each g is independently 1, 2, 3 or 4,

with the proviso that when at least one $R_1$ is other than hydrogen, X is a direct bond, linear or branched $C_{1-4}$alkylene,

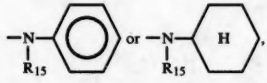


wherein $R_{15}$–$R_{17}$ are as defined above, and each q is independently 0 or 1, wherein

each $R_8$ is independently hydrogen or $C_{1-4}$alkyl,

each $R_{15}$ is independently hydrogen or $C_{1-4}$alkyl,

each $R_{28}$ is independently halo, hydroxy, amino, —NH—$C_2H_4OH$, —$N(C_2H_4OH)_2$, —NH—$(CH_2)_m$—Z, —NH—$(CH_2)_d$—CN, —NH—$(CH_2)_d$—O—$C_{1-4}$alkyl, morpholino,



wherein

$R_{15}$ and Z are as defined above, and

d and m are as defined below,

each Z is independently as defined above,

each $A^{\ominus}$ is independently a non-chromophoric anion,

each a is independently 1 or 2,

each d is independently 2 or 3, and

each m is independently 1, 2, 3, 4, 5 or 6,

with the provisos that (i) the compound of Formula I has at least two basic water-solubilizing groups, and (ii) each end of X is in the 3- or 4-position of the Ring A to which it is attached.

**4,591,636**

## ANTHRACYCLINE GLYCOSIDES

**Michael J. Broadhurst, Baldock; Cedric H. Hassall, Harpenden, and Gareth J. Thomas, Luton, all of Great Britain, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

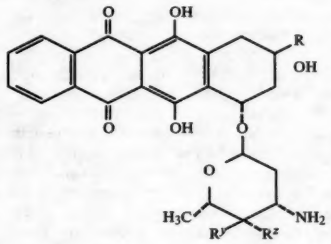
**Continuation of Ser. No. 280,718, Jul. 6, 1981, abandoned. This application Dec. 17, 1984, Ser. No. 682,448**

**Claims priority, application United Kingdom, Jul. 18, 1980, 8023498; May 26, 1981, 8116053**

**Int. Cl.[4] C07H** *15/252*

**U.S. Cl. 536—6.4** **9 Claims**

1. A compound of the formula



I

wherein R is a lower alkyl but not ethyl or carboxy or a group of the formula

—$(CH_2)_n$—OY a

in which n stands for 1 or 2 and Y is hydrogen or lower alkyl and $R^Y$ and $R^Z$ each are hydrogen or one of $R^Y$ and $R^Z$ is hydrogen and the other is hydroxy,

and pharmaceutically acceptable acid addition salts thereof.

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**4,591,637**

## OPEN CHAIN-MORPHOLINO ADRIAMYCINS

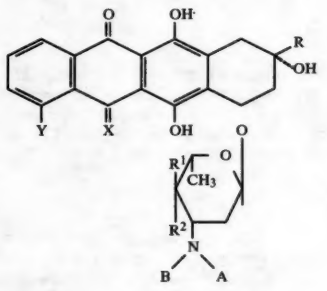
**Edward M. Acton, Menlo Park, and George L. Tong, Cupertino, both of Calif., assignors to SRI International, Menlo Park, Calif.**

**Filed Jan. 17, 1985, Ser. No. 692,664**

**Int. Cl.[4] C07H** *15/24*

**U.S. Cl. 536—6.4** **5 Claims**

1. A compound of the formula:



and the pharmaceutically acceptable salts thereof wherein R is:

—CO—$CH_3$, —CHOH—$CH_3$, —CO—$CH_2OH$, —CHOH—$CH_2OH$, hydrogen, hydroxy, 1 to 3 carbon alkyl, 1 to 3 carbon terminal hydroxyalkyl; or,

a 2 to 7 carbon ester or diester of said —CO—$CH_2OH$, —CHOH—$CH_2OH$, —CHOH—$CH_3$ or of said 1 to 3 carbon terminal hydroxyalkyl; or

said —CO—$CH_2OH$, —CHOH—$CH_2OH$, or —CHOH—$CH_3$ or said 1 to 3 C-terminal hydroxyalkyl

having 1 to 6 carbon alkyl or aryl ether replacements of one or more of the hydroxyls; or

13-ketimine derivatives of —CO—$CH_3$ and —CO—$CH_2OH$;

Y is hydrogen, hydroxy, or methoxy,

X is O or NH, but when Y is hydrogen or hydroxy, X must be O;

at least one of $R^1$ and $R^2$ is hydrogen and the other is hydrogen, hydroxy, or methoxy;

B is H, alkyl (1–6) or aryl (6–15) which is unsubstituted or which contains substituents selected from the group consisting of halo, lower alkyl (1–4) nitro or lower alkoxy; lower alkyl (1–4), said alkyl or said unsubstituted or substituted aryl lower alkyl also being unsubstituted or substituted with hydroxy, alkoxy, carbonyl, cyano or ester group substitutions; or

B and $R^2$ taken together, in order, are the methylene-oxygen bridge —$CH_2$—O—; and

A is —$CHR^3CN$ wherein $R^3$ is H, aryl (6–15), which is unsubstituted or which contains substituents selected from the group consisting of halo, lower alkyl (1–4) nitro or lower alkoxy; alkyl (1–6) or aryl lower alkyl (1–4), wherein the aryl is unsubstituted or contains substituents selected from the group consisting of halo, lower alkyl (1–4) nitro or lower alkoxy; said alkyl or aryl lower alkyl is unsubstituted or contains hydroxy, alkoxy, carbonyl, or ester group substitutions.

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**4,591,638**

## DEXTRAN OR CROSSLINKED DEXTRAN HAVING QUATERNARY AMINO GROUPS

**Leif G. Ahrgren, Tierp, and Anthony N. de Belder, Upsala, both of Sweden, assignors to Pharmacia AB, Upsala, Sweden**

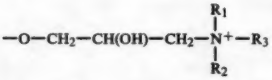
**Filed May 11, 1982, Ser. No. 377,193**

**Claims priority, application Sweden, May 19, 1981, 8103137**

**Int. Cl.[4] C08B *37/02***

**U.S. Cl. 536—51** **15 Claims**

1. A polymer consisting of dextran or crosslinked dextran containing quarternary amino groups wherein the quarternary amino groups have the formula



(I)

where $R_1$, $R_2$ and $R_3$, which may be identical or different, are lower alkyl groups of 1–5 carbon atoms, or lower hydroxyalkyl groups having 2–5 carbon atoms and 1–2 hydroxy groups with at most one hydroxy group being bound to one and the same carbon atom in the hydroxyalkyl group.

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**4,591,639**

## MICROBIAL POLYSACCHARIDE AMINE ADDUCTS

**Edgar Fischer, Frankfurt am Main, and Hartmut Voelskow, Hattersheim am Main, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Aug. 12, 1983, Ser. No. 522,608**

**Claims priority, application Fed. Rep. of Germany, Aug. 14, 1982, 3230303**

**Int. Cl.[4] C08B *37/00***

**U.S. Cl. 536—114** **2 Claims**

1. A xanthan adduct of an amine of the fomula $NR^1R^2R^3$ in which $R^1$ is alkyl having 10 to 20 carbon atoms, and $R^2$ and $R^3$, which are identical or different, denote methyl or ethyl.

**4,591,640**

## METHOD FOR CROSS-LINKING OF AGAR PRODUCTS

**Stellan Hjertén, Långvägen 7 B, S-752 52 Upsala, Sweden**

**Filed Jan. 22, 1985, Ser. No. 693,106**

**Claims priority, application Sweden, Jan. 23, 1984, 8400305**

**Int. Cl.[4] C08B *37/12***

**U.S. Cl. 536—114** **8 Claims**

1. Method for cross-linking of agar products in an alkaline surrounding, characterized in that divinylsulfone is used as cross-linking agent in a manner known per se, that the cross-linking is performed at pH>11 in the presence of a reducing agent, and that unreacted vinyl groups are deactivated by means of a neutral hydrophilic deactivating substance comprising several hydroxyl groups.

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**4,591,641**

## SUBSTITUTED VINYL CEPHALOSPORINS

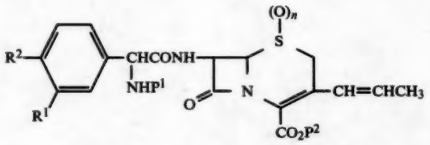
**Hideaki Hoshi, Ichikawa; Jun Okumura, Yokohama; Takayuki Naito, Kawasaki; Yoshio Abe, and Shimpei Aburaki, both of Tokyo, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.**

**Division of Ser. No. 564,604, Dec. 28, 1983, Pat. No. 4,520,022, which is a continuation-in-part of Ser. No. 461,833, Jan. 28, 1983, abandoned. This application Mar. 18, 1985, Ser. No. 713,207**

**Int. Cl.[4] C07D *501/22*; A61K *31/545***

**U.S. Cl. 544—16** **4 Claims**

1. A compound selected from the group consisting of those having the formula



and the Z-configuration about the exocyclic double bond wherein

n is the integer 0, or 1,

$R^1$ is hydrogen, $OP^3$, lower alkoxy, or halogen,

$P^1$, $P^2$, and $P^3$ are hydrogen atoms or conventional protecting groups used in cephalosporin chemistry respectively with amino, carboxy, and hydroxy groups,

$R^2$ is hydrogen, or $OP^3$, the acid addition salts of the foregoing substances wherein $P^1$, is hydrogen, and the metal salts of the foregoing substances wherein $P^2$ is hydrogen wherein at least one of $P^1$, $P^2$, and $P^3$ is a said protecting group when n is zero.

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**4,591,642**

## CEPHEM AND CEPHAM DERIVATIVES

**Riccardo Scartazzini, Allschwil, and Hans Bickel, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

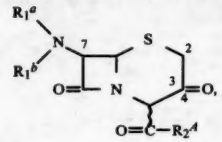
**Division of Ser. No. 655,663, Feb. 5, 1976, Pat. No. 4,477,658, which is a continuation-in-part of Ser. No. 373,819, Jun. 26, 1973, abandoned. This application Aug. 29, 1984, Ser. No. 645,472**

**Claims priority, application Switzerland, Jun. 29, 1972, 9787/72; Dec. 22, 1972, 18721/72**

**Int. Cl.[4] C07D *501/04*; A61K *31/545***

**U.S. Cl. 544—16** **17 Claims**

1. A 7$\beta$-amino-cepham-3-one-4-carboxylic acid compound of the formula


(I)

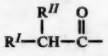
a 1-oxide thereof, a 1-oxide of the 3-hydroxy-3-cephem form thereof, or a salt of such compound, wherein $R_1^a$ represents a group of the formula

($A_1$)

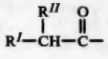
wherein $R^I$ represents hydrogen, an unsubstituted heterocyclic group or an heterocyclic group substituted by lower alkyl, and/or phenyl, which can in turn carry halogen, or an amino group which is N-substituted by lower alkyl or halogen-substituted lower alkyl or $R_1^a$ represents a group of the formula

($A_2$)

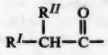
wherein $R^I$ represents lower alkyl, halogeno-lower alkyl, phenyloxy-lower alkyl, hydroxyphenyloxy-lower alkyl, protected hydroxyphenyloxy-lower alkyl, halogeno-phenyloxy-lower alkyl, and lower alkyl substituted by amino and/or carboxyl, wherein amino is free or protected, and carboxyl is free or protected, or $R^I$ represents pyridyl, pyridinium, thienyl, furyl, imidazolyl or tetrazolyl, or these heterocyclic groups substituted by lower alkyl, amino, protected amino, aminomethyl or protected aminomethyl or $R^I$ represents lower alkoxy, phenyloxy, hydroxyphenyloxy, protected hydroxyphenyloxy, halogeno-phenyloxy, lower alkylthio, phenylthio, pyridylthio, 2-imidazolylthio, 1,2,4-triazol-3-ylthio, 1,3,4-triazol-2-ylthio, 1,2,4-thiadiazol-3-yltio, 1,3,4-thiadiazol-2-ylthio, or 5-tetrazolylthio, and these heterocyclylthio groups substituted by lower alkyl, or $R^I$ represents halogeno, lower alkoxycarbonyl, cyano, carbamoyl, N-lower alkyl-carbamoyl, N-phenylcarbamoyl, lower alkanoyl, benzoyl or azido, or $R_1^a$ represents a group of the formula


($A_3$)

wherein $R^I$ represents lower alkyl, furyl, thienyl or isothiazolyl, and $R^{II}$ represents amino, protected amino, guanidinocarbonylamino, sulphoamino, sulphoamino in salt-form, azido, carboxyl, carboxyl in salt-form, protected carboxyl, cyano, sulpho, hydroxy, protected hydroxyl, O-lower alkyl-phosphono, O,O'-di-lower alkyl-phosphono or halogeno, or $R_1^a$ represents a group of the formula


($A_4$)

wherein $R^I$ and $R^{II}$ each represent halogeno, or lower alkoxycarbonyl, or $R_1^a$ represents a group of the formula


($A_5$)

wherein $R^I$ represents furyl, thienyl or isothiazolyl, and $R^{II}$ represents aminomethyl or protected aminomethyl, or $R_1^a$ represents a group of the formula

($A_6$)

wherein each of the groups $R^I$, $R^{II}$ and $R^{III}$ represents lower alkyl, and $R_2^A$ represents a radical which together with the carbonyl grouping —C(=O)— forms a protected carboxyl group.

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**4,591,643**

## TRIPHENDIOXAZINE REACTIVE DYESTUFFS

**Horst Jäger, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Oct. 3, 1984, Ser. No. 657,304**

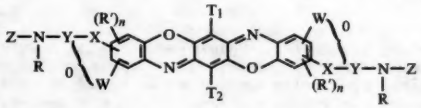
**Claims priority, application Fed. Rep. of Germany, Oct. 6, 1983, 3336362**

**The portion of the term of this patent subsequent to May 13, 2003, has been disclaimed.**

**Int. Cl.[4] C09B** *19/00, 19/02*

**U.S. Cl. 544—76** **9 Claims**

1. A triphendioxazine dyestuff of the formula



wherein

R represents hydrogen, $C_1$–$C_6$-alkyl, optionally substituted by OH, $OCH_3$, COOH, $SO_3H$ or $OSO_3H$

$T_1$ and $R_2$, independently of each other, each represent H, Cl, Br, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, phenyl or phenoxy

X represents O, S or

Z denotes a reactive group or hydrogen

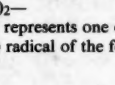
Y represents $—(CH_2)_{2\text{-}6}—$, 1,4- or 1,3-phenylene optionally substituted by $CH_3$, $SO_3H$ or COOH

R' represents Cl, Br, $SO_3H$, COOH, $C_1$–$C_4$-alkyl or $C_1$–$C_4$-alkoxy

R'' represents H, $C_1$–$C_4$-alkyl, and in the event that Y denotes $—(CH_2)_{2\text{-}6}—$ also together with R denotes $—(CH_2)_2—$

W represents one of the following meanings:

(a) radical of the formula



wherein

B is $C_2$–$C_6$-alkylene—$(O)_n$—$SO_3H$ wherein n is 0 or 1

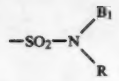
(b) radical of the formula

$$—SO_2—NH—SO_2—R'''$$

wherein

R''' represents $C_1$–$C_6$-alkyl, phenyl, optionally substituted by $CH_3$

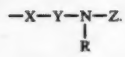
(c) radical of the formula



wherein

$B_1$ is phenyl having 1–2 sulfo groups

the radical W is in the ortho-position relative to the substituent



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**4,591,644**

## METHOD AND INSTALLATION FOR THE PREPARATION OF MELAMINE

**Joseph F. M. Leerschool, Beek, and Hubert J. Dols, Geleen, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands**

**Filed Jul. 6, 1984, Ser. No. 628,602**

**Claims priority, application Netherlands, Dec. 21, 1983, 8304381**

**Int. Cl.[4] C07D *251/60***

**U.S. Cl. 544—201** **3 Claims**

1. In a method for the preparation of melamine by the conversion of urea and/or thermal decomposition products thereof, wherein the synthesis effluent from the melamine reactor, containing ammonia, carbon dioxide and gaseous melamine, is cooled by means of an aqueous medium thereby forming a corrosive-erosive aqueous solution or suspension containing ammonium carbamate and melamine, which aqueous solution or suspension is further processed to remove solid product melamine therefrom, the improvement wherein, in order to substantially resist the corrosive-erosive effect of said solution or suspension, at least a portion of the equipment surfaces exposed to said solution or suspension during processing is fabricated from a stainless steel with a ferritic austenitic duplex structure containing, by weight, from about 20 to 30 percent chromium, 1 to 10 percent nickel, from 0 to about 10 percent manganese, such that the sum of the nickel plus one-half of the manganese content is within the range of between 4 and 10 percent, 1 to 5 percent molybdenum, 0 to 3 percent copper, and not more than 0.1 percent carbon, the remainder being iron and not more than about 5 percent by weight impurities and other additives, relative to the total weight of said stainless steel, and wherein said processing is carried out in the absence of passivating oxygen.

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**4,591,645**

## PROCESS FOR THE PRODUCTION OF 2-(HYDROCARBYLDITHIO)-5-MERCAPTO-1,3,4-THIADIAZOLES

**Peter Hugo, and Rainer Noack, both of Berlin, Fed. Rep. of Germany, assignors to Rhein-Chemie Rheinau GmbH, Mannheim, Fed. Rep. of Germany**

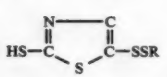
**Filed Aug. 14, 1984, Ser. No. 640,614**

**Claims priority, application Fed. Rep. of Germany, Aug. 27, 1983, 3330920**

**Int. Cl.[4] C07D *285/12***

**U.S. Cl. 548—142** **3 Claims**

1. A process for the production of compounds corresponding to the following formula:



in which R represents a tertiary hydrocarbon radical containing from 4 to 60 carbon atoms, characterized in that bis-(2,5-dithio-1,3,4-thiadiazole) is reacted with a compound corresponding to the formula:

in which R is as defined above.

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**4,591,646**

## PHOTOGRAPHIC PRODUCTS AND PROCESSES

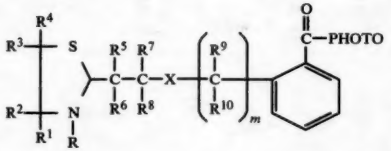
**Frank A. Meneghini, Arlington, and Paul S. Palumbo, West Newton, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Division of Ser. No. 500,414, Jun. 2, 1983, Pat. No. 4,468,450. This application Jul. 23, 1984, Ser. No. 633,697**

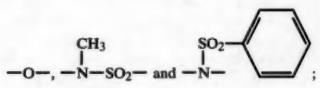
**Int. Cl.[4] C07D *277/04***

**U.S. Cl. 548—146** **1 Claim**

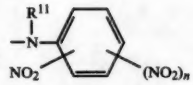
1. A compound of the formula



wherein R is selected from alkyl, aryl, aralkyl and alkaryl; $R^1$ is selected from hydrogen, carboxy, N,N-dialkylcarboxamido, alkyl, aryl, aralkyl and alkaryl; $R^2$, $R^3$ and $R^4$ each are selected from hydrogen, alkyl, aryl, aralkyl and alkaryl; $R^5$ is selected from hydrogen and a carboxy group; $R^6$, $R^7$ and $R^8$ each are selected from hydrogen, alkyl, aryl, aralkyl, and alkaryl; $R^9$ and $R^{10}$ each is selected from hydrogen, alkyl, aryl, aralkyl and alkaryl; X is a group selected from



m is 0 or 1; and PHOTO is



wherein $R^{11}$ is hydrogen, alkyl, aryl, alkaryl and aralkyl and n is 0 or 1.

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**4,591,647**

## PROCESS FOR THE PRODUCTION OF 2,2'-DIBENZOTHIAZOLYL DISULPHIDE

**Alfredo Wüst, Roesrath, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Aug. 16, 1984, Ser. No. 641,528**

**Claims priority, application Fed. Rep. of Germany, Aug. 19, 1983, 3329976**

**Int. Cl.[4] C07D *277/78***

**U.S. Cl. 548—157** **5 Claims**

1. A process for the production of 2,2'-dibenzothiazolyl disulphide comprising oxidizing aqueous, from 8 to 50%, by weight, alkali metal salt solutions of 2-mercaptobenzothiazole using chlorine or chlorine/air mixtures at temperatures of from 15° to 60° C. and pH values of from 9 to 13, and maintaining a concentration of the alkali metal salt of 2-mercaptobenzo-

thiazole such that at no time during the reaction does said concentration amount to less than 2.5%, by weight.

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4,591,648

## HISTIDINE PROTECTION

John H. Jones, Oxford, and Tom Brown, Cambridge, both of England, assignors to National Research Development Corp., London, England

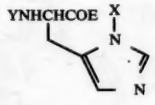
Filed Mar. 24, 1982, Ser. No. 361,432

Claims priority, application United Kingdom, Apr. 1, 1981, 8110116

Int. Cl.[4] C07D *233/64*

U.S. Cl. 548—344 15 Claims

1. A compound of formula I




wherein X is $—CH_2OCH_2Ar$ in which Ar represents phenyl or p-bromophenyl, Y represents Boc, Fmoc or, benzyloxycarbonyl, or hydrogen, and E represents OH or OR, wherein R is a $C_1$–$C_6$ alkyl group.

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4,591,649

## COMPOUNDS BONDABLE TO TOOTH SUBSTRATES

Tadashi Hirasawa, Tokyo, and Ikuro Harashima, Yokohama, both of Japan, assignors to G-C Dental Industrial Corp., Tokyo, Japan

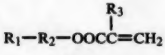
Filed Mar. 18, 1985, Ser. No. 712,429

Claims priority, application Japan, Mar. 27, 1984, 59-58783

Int. Cl.[4] C07D *307/77, 307/92*

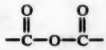
U.S. Cl. 549—232 4 Claims

1. A compound which is bondable to tooth substrates, having the formula



wherein

$R_1$ is a naphthyl group substituted with a



group at any one of the 1,2-; 2,3-; and 1,8 positions, and

$R_2$ is any one of the following groups having any one of carboxylate, carbonyl, and —O— moiety, to be connected to $R_1$:

a group having the formula $—(CH_2)_m—$ in which m=1–4,

a group having the formula $—(CH_2)_n—COO—(CH_2)_p—$ in which $n \neq 0$, $p \neq 0$, and $n+p=2$–4, or

a group having the formula $—(CH_2—CH_2—O)_q—CH_2—CH_2—$ in which q=1 or 2,

wherein when said $R_1$ group is substituted at the 1,2 position, then $R_2$ is bonded to the naphthyl group at any one of the 4, 5, 6 and 7 positions; when said $R_1$ group is substituted at the 2,3 position, then $R_2$ is bonded to the naphthyl group at any one of the 5 and 6 positions; and when said $R_1$ group is substituted at the 1,8 position, then $R_2$ is bonded to the naphthyl group at any one of the 3 and 4 positions, and

$R_3$ is a hydrogen atom or a methyl group.

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4,591,650

## HEXANOR-BRASSINOLID-22-ETHERS

Ulrich Kerb; Ulrich Eder, and Hansjörg Krähmer, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin, Fed. Rep. of Germany

Filed Feb. 13, 1984, Ser. No. 579,856

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1983, 3305747

Int. Cl.[4] C07D *313/10*

U.S. Cl. 549—268 17 Claims

1. 2α,3α-di-hydroxy-20S-propoxymethyl-B-homo-7-oxa-5α-pregnane-6-one.

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4,591,651

## PROCESS FOR DIRECTLY CONVERTING AN ALDEHYDE INTO AN ETHYLENE ESTER

Michel Delmas, Montgiscard; Antoine Gaset, Toulouse, and Yves Le Bigot, Bragassargues, all of France, assignors to Agrifurane S.A., France

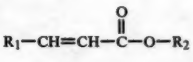
Filed Sep. 26, 1984, Ser. No. 654,497

Claims priority, application France, Sep. 30, 1983, 83 15753

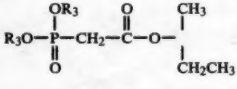
Int. Cl.[4] C07C *67/00;* C07D *307/54*

U.S. Cl. 549—473 7 Claims

1. A process for directly converting an aldehyde of the formula $R_1CHO$ into an ethylenic ester of the formula:



the process comprising reacting said aldehyde in the presence of a phosphonate of the formula



and in the presence of an alkaline carbonate or alkaline bicarbonate with an alcohol or polyol solvent of the formula $R_2(OH)_n$,

wherein $R_1$ is hydrogen, furyl, tetrahydrofurfuryl, nitro-5-furyl, phenyl, p-hydroxyphenyl or butyl,

$R_2$ is propyl, butyl, furfuryl, tetrahydrofurfuryl, benzyl, or long chain fatty alkyl having at least 8 carbon atoms, and n is 1 to 5, and

$R_3$ is methyl or ethyl,

and wherein the molar ratio of said alkaline carbonate or alkaline bicarbonate to said aldehyde is greater than one, and the molar ratio of said alcohol or polyol solvent to said aldehyde is greater than two.

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4,591,652

## POLYHYDROXYL SILANES OR SILOXANES

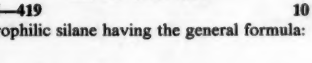
Ralph J. DePasquale, and Michael E. Wilson, both of Jacksonville, Fla., assignors to SCM Corporation, New York, N.Y.

Filed Apr. 12, 1985, Ser. No. 722,326

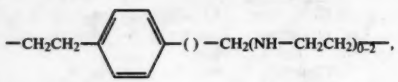
Int. Cl.[4] C07F *7/10*

U.S. Cl. 556—419 10 Claims

1. A hydrophilic silane having the general formula:



wherein $R^1$ and $R^2$ are independently selected from $C_1$–$C_3$ monovalent hydrocarbon radicals; $R^3$ is a divalent radical selected from $C_1$–$C_{12}$ hydrocarbon radicals; $—(CH_2—)_3—(NHCH_2CH_2)—_{1\text{-}20}$;



phenylene; $R^4$ is selected from hydrogen, $R^1$ and phenyl; x is 0, 1, 2, or 3, and n is an integer from 3 to 5.

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**4,591,653**

## SILICONE-POLYIMIDE PRECURSOR AND PROCESS FOR PRODUCING SAME

**Kouichi Kunimune, Ichiharashi; Yoshiya Kutsuzawa, Yokohamashi, and Shiro Konotsune, Yokosukashi, all of Japan, assignors to Chisso Corporation, Osaka, Japan**

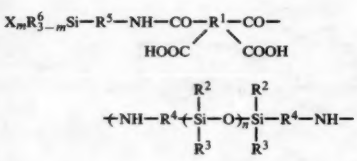
**Filed Aug. 28, 1985, Ser. No. 770,223**

**Claims priority, application Japan, Oct. 29, 1984, 59-227272**

**Int. Cl.[4] C07F 7/08, 7/10**

**U.S. Cl. 556—419** **12 Claims**

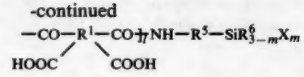
1. A silicone-polyimide precursor expressed by the general formula (1)



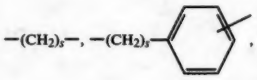
(1)

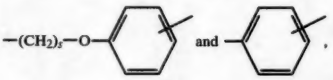


-continued

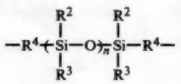


wherein $R^1$ represents a tetravalent, carbocyclic aromatic group; $R^2$, $R^3$ and $R^6$ are the same or different groups being selected from the group consisting of an alkyl group of 1 to 6 carbon atoms, phenyl group and an alkyl-substituted phenyl group of 7 to 12 carbon atoms; $R^4$ and $R^5$ are the same or different groups being selected from the group consisting of





wherein s represents an integer of 1 to 4; said group



has an average formula weight of 368 to 7,968; X represents an alkoxy group, acetoxy group, a halogen atom or hydroxy group; ms at both the ends of the formula (1) independently represent an integer of 1 to 3; and l represents an integer of 1 to 30.

4,591,654

## SOLAR CELLS BASED ON INDIUM PHOSPHIDE

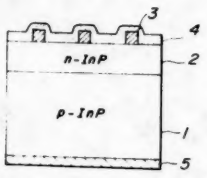
Masafumi Yamaguchi; Akio Yamamoto, and Chikao Uemura, all of Mito, Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Musashino, Japan

Filed Jul. 16, 1984, Ser. No. 631,091

Claims priority, application Japan, Jul. 18, 1983, 58-129542; Oct. 24, 1983, 58-197516; Apr. 13, 1984, 59-74493

Int. Cl.[4] H01L *31/06*

U.S. Cl. 136—252 22 Claims




1. An InP solar cell comprising:

a p-type InP single crystal substrate having a carrier concentration of $2\times10^{16}$–$2\times10^{18}$ $cm^{-3}$;

an n-type InP layer containing a dopant of at least one group VIA element selected from S and Se disposed on said substrate and with a thickness of 0.05–1 μm, said n-type InP layer having a carrier concentration of $5\times10^{17}$–$1\times10^{}cm^{3}$;

a grid electrode arranged on said n-type InP layer; and

an anti-reflection coating formed on said n-type InP layer and said grid electrode.

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4,591,655

## METAL-ENCAPSULATED GAS-INSULATED HIGH-VOLTAGE LINE

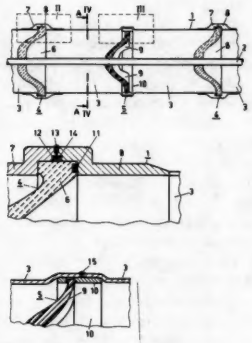
Franz Czech, Niederhasli, and Carl D. Flöessel, Fislisbach, both of Switzerland, assignors to BBC Brown, Boveri & Company Ltd., Switzerland

Filed Aug. 28, 1984, Ser. No. 645,006

Claims priority, application Switzerland, Aug. 31, 1983, 4777/83

Int. Cl.[4] H02G *15/24*

U.S. Cl. 174—22 C 9 Claims



1. A high voltage line comprising:

an elongated metal encapsulation including a plurality of pipe sections which are arranged end to end and welded to one another, each pipe section having respective annular first and second mating extensions at each end thereof, the mating extensions defining an enlarged diameter annular space in the encapsulation at the juncture between adjacent pipe sections, the pipe wall thickness of said metal encapsulation being larger at said mating extensions than the thickness thereof at other locations of said pipe sections, each mating extension being bevelled so that a V-shaped annular groove is formed between said adjacent pipe sections, said V-shaped groove being filled with a welding seam, and at least one increased diameter annular section in each one of said pipe sections between said first and second mating extensions of said pipe sections;

an electrical conductor which extends through said metal encapsulation coaxially with an axis of said metal encapsulation;

a plurality of partitioning insulators, each partitioning insulator being located in said metal encapsulation and at a respective one of said enlarged diameter annular spaces defined by said adjacent pipe sections, each of said partitioning insulators forming an air-tight connection with said metal encapsulation, thereby to divide said metal encapsulation into a plurality of air-tight compartments, each of said partitioning insulators having an insulation body, said conductor passing through said insulation body of said partitioning insulators; and

a plurality of support insulators, each support insulator having a body of insulation material, at least one opening through said insulation body, and an annular periphery which is supported at said increased diameter annular section located between said mating extensions, said conductor passing through said plurality of support insulators, whereby arcs which may develop in said metal encapsulation are capable of passing through said at least one opening in said support insulators toward said mating extensions of said pipe sections which have a greater wall thickness, thereby to eliminate arc damage to said high voltage line.

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4,591,656

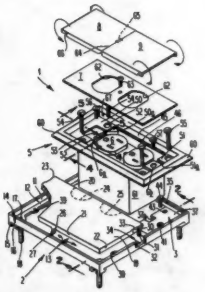
## ACTIVATION KITS FOR PRE-SETS

Gregory L. Mohr, Mineral Wells, W. Va., assignor to Butler Manufacturing Company, Kansas City, Mo.

Filed May 31, 1983, Ser. No. 499,228

Int. Cl.[4] H02G *3/12*

U.S. Cl. 174—48 8 Claims



1. An activation kit in combination with an underfloor pre-set unit, the pre-set having a top opening and nut means in the top opening, the activation kit comprising:

an annular adjusting ring disposed in said top opening and having a vertically extending flange and a support flange connected thereto and extending horizontally inwardly therefrom and forming a ring opening;

means on said ring forming a plurality of adjusting screw retaining slots, each slot comprised of a horizontally extending section and a vertically extending section and each section being open to the periphery of the ring whereby, when the ring is free from the pre-set, the head

of an adjusting screw can be moved into the horizontal section and the threads thereof move into the vertical section from a point exterior to the ring;

a plurality of adjusting screws respectively disposed in said slots with the heads in the horizontal sections and threads in the vertical sections, the threads of the screws being respectively threaded into said nuts;

a plurality of holes formed in said support flange respectively in communication with said horizontal sections and providing access to the head of an adjusting screw in a horizontal section for turning the same to vertically move the adjusting ring relative to the pre-set unit;

at least one snap-in access hatch mounted on said support flange and being dimensioned to partially cover said ring opening, the hatch having:

(a) an inner edge extending across said ring opening and an outer edge adjacent said vertically extending flange;

(b) a pair of downwardly extending flexible keeper fingers disposed adjacent opposite ends of said inner edge, each finger having keeper means adjacent its lower end;

(c) at least one downwardly extending locking finger disposed on said outer edge and having retainer means adjacent its lower end;

(d) means adjacent said inner edge forming a plurality of knock-outs; and

a plurality of slots formed on the support flange respectively receiving said fingers whereby said keeper means and said retainer means are underneath and in engagement with said vertical flange.

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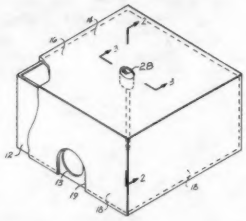
**4,591,657**

## TAMPER-PROOF EQUIPMENT SECURING HOUSING

**Larry C. Masters, Rte. 1, Gap Creek Rd., Marietta, S.C. 29661**

**Filed Jul. 5, 1983, Ser. No. 510,672**
**Int. Cl.[4] H05K *5/00***
**U.S. Cl. 174—50** **2 Claims**



1. A housing for securing equipment therein connected by the means of an electrical conductor to the exterior thereof comprising:

a bottom member having a base with sides extending upwardly therefrom;

a cover corresponding in size with said bottom including a top and side walls extending downwardly therefrom overlapping said sides of said bottom member and terminating adjacent said base producing a housing having double side walls;

an opened top recessed housing extending downwardly from said top of said cover with said opened top being flush with said top of said cover;

a locking rod having a lower end secured to said base of said bottom member and an upper end terminating in said recessed housing;

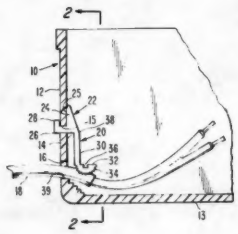
a key-operated lock carried in said cover having an opening provided therein for receiving said upper end of said locking rod for locking said cover onto said bottom member while maintaining the entire lock below the top of said cover only exposing a key receiving face of said lock.

**4,591,658**

## CABLE CLAMP ATTACHMENT FOR ELECTRICAL OUTLET BOXES OR THE LIKE

**Claude J. Bauer, Belpre, Ohio; Vernon D. Dellinger, Parkersburg, and Oral F. Leep, Vienna, both of W. Va., assignors to Challenger Electrical Marterials, Inc., Parkersburg, W. Va.**

**Filed Oct. 17, 1984, Ser. No. 661,749**
**Int. Cl.[4] H02G *3/08***
**U.S. Cl. 174—65 R** **7 Claims**



1. A cable clamp attachment for an electrical outlet box of the type having a first wall serving as a bottom wall and a second wall that extends from the first wall, said second wall having inner and outer surfaces and being formed with a mounting opening and a cable entrance both of which open upon said surfaces, said attachment being in the form of a single molded plastic piece comprising:

(a) a mounting means adapted to constitute the sole point of connection of the clamp attachment to an outlet box of the type described, said means being formed at one end of said attachment and being adapted to extend through said mounting opening in engagement with the outer and inner surfaces of the box, in position to dispose the other end of the attachment in spaced relation to said bottom wall of the outlet box adjacent the cable entrance and free of any connection to the box, whereby a cable inserted through said entrance may be extended between and engaged directly by the bottom wall and said other end of the attachment; and

(b) an elongated, resiliently yieldable clamping leg having a proximal end integrally joined with the mounting means and a distal end formed with a clamping head for engaging the inserted cable, the clamping leg being initially inclined angularly inwardly in respect to the mounting means to dispose the clamping head initially approximately directly below the mounting means with the leg in close proximity to the cable entrance of the associated outlet box, said head being adapted for engagement with an inserted cable for resilient flexure of the leg, responsive to insertion of the cable, away from the cable entrance and said second wall of the associated box,

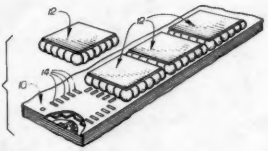
the mounting means including inner and outer end portions engageable against said inner and outer surfaces, respectively, of said second outlet box wall, at least the inner end portion having a flat face extendable along its associated surface of the second wall of the outlet box when the mounting means is extended through the mounting opening, said distal end of the clamping leg, in the initial angular inclination of the clamping leg, extending through the plane of said face, the mounting means further including a connecting portion joining the respective end portions thereof and extending through said mounting opening, the inner and outer portions of the mounting means extending in the same direction from the connecting portion.

4,591,659

## MULTILAYER PRINTED CIRCUIT BOARD STRUCTURE

Joseph D. Leibowitz, Culver City, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Dec. 22, 1983, Ser. No. 564,952
Int. Cl.[4] H05K 1/03
U.S. Cl. 174—68.5 8 Claims



1. A multilayer printed circuit board having a desired coefficient of thermal expansion, good thermal conductivity and low dielectric constant, said circuit board comprising:

a plurality of layers of conductive metal used to establish connections between components to be mounted on the board;

a plurality of layers of graphite, at least some of which are positioned in close proximity to some of said layers of conductive metal, to provide a relatively low resistance path for the flow of heat from said layers of conductive metal; and

a plurality of layers of a dielectric material bonded together with said layers of conductive metal and graphite, to yield a composite multilayer printed circuit board;

wherein said layers of graphite are positioned in a symmetrical manner with respect to the thickness of the composite board, and selected in number to provide a desired composite coefficient of thermal expansion, and formed from woven sheets of graphite impregnated with a bonding material;

and wherein said graphite sheets are bonded to adjacent sheets of conductive metal by a thin layer of insulating adhesive, whereby the layer of adhesive serves the additional purpose of electrically separating the conductive metal from the conductive graphite layer;

and wherein said sheets of conductive metal are of copper; and

said sheets of dielectric material include a polytetrafluoroethylene (PTFE) material.

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4,591,660

## COMMON CONTROL AUDIO DECRYPTOR

Dominick Scordo, Middletown, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

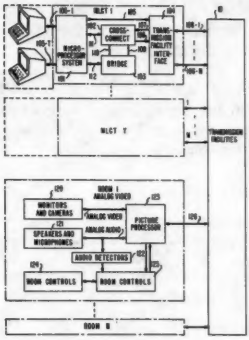
Filed Oct. 25, 1983, Ser. No. 545,364
Int. Cl.[4] H04L 9/00
U.S. Cl. 178—22.05 17 Claims

1. Apparatus for simultaneously decrypting a plurality of randomly phased received signals, each of the received signals including signal samples and corresponding decipherment control bits, the apparatus for decrypting comprising, first common time shared means responsible to encryption requests and utilizing supplied blocks of plain test data associated with said requests and an encryption key code for generating corresponding blocks of cipher text data,

second common time shared means responsive to the decipherment control bits from each of the plurality of received signals for obtaining said blocks of plain text data corresponding on a one-to-one basis to each of the plurality of received signals and for generating said corresponding encrypton requests,

third common time shared means controllably utilizing said blocks of cipher text data for decrypting the associated ones of said received signals, and

a plurality of process state counters each associated on a one-to-one basis with a corresponding one of said plurality of received signals for directing operation of said second and third common time shared means in accordance with prescribed operations identified by the state of a decipherment control bit stream formed by the decipherment control bits of said corresponding one of the received signals.



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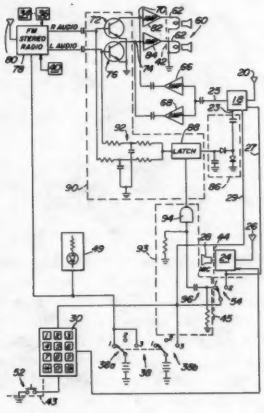
4,591,661

## PORTABLE CORDLESS TELEPHONE TRANSCEIVER-RADIO RECEIVER

Joseph A. Benedetto, 6446 Drexel Rd., Philadelphia, Pa. 19151, and Neal H. Shepherd, Lynchburg, Va., assignors to Joseph A. Benedetto, Philadelphia, Pa.

Filed Aug. 15, 1984, Ser. No. 641,124
Int. Cl.[4] H04Q 7/04
U.S. Cl. 179—2 EA 10 Claims



1. Portable cordless telephone transceiver-radio receiver comprising:

(a) a radio receiver circuit for receiving broadcast RF signals and for generating audio signals based thereon,

(b) a telephone receiver circuit for receiving broadcast RF telephone speech and ring signals and for generating audio speech and ring signals based thereon,

(c) a headset adpated to be coupled to said radio receiver circuit and to said telephone receiver circuit for producing sound based on said radio receiver circuit audio signals

and said telephone receiver circuit audio speech and ring signals,

(d) settable/resettable blocking means for blocking said radio receiver circuit audio signals from reaching said headset when set and for passing said radio receiver circuit audio signals to said headset when reset,

(e) means for detecting presence or absence of said telephone receiver circuit audio ring signal and for automatically setting said blocking means when a telephone receiver circuit audio ring signal is detected, and

(f) operator manipulable switch means for resetting said blocking means.

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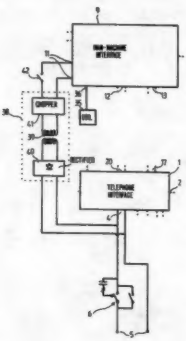
**4,591,662**

## TELEPHONE SET-COMPUTER TERMINAL ASSEMBLY WITH A SINGLE DECIMAL KEYBOARD AND A SWITCHABLE LOCAL POWER SUPPLY

**Michel Legros, Croissy-sur-Seine, and Jean Montenot, Bonneville, both of France, assignors to Horlogerie Photographique Francaise, France**

**Filed Jun. 22, 1984, Ser. No. 623,312**
**Claims priority, application France, Jun. 30, 1983, 83 11199**
**Int. Cl.[4] H04M *11/00***
**U.S. Cl. 179—2 DP** **6 Claims**



1. A telephone set-computer terminal assembly comprising a telephone interface is connected to a control keyboard, to a telephone line through first switch means and to a telephone handset, the telephone interface generating and emitting signals over the telephone line including dialling signals selected via the control keyboard, the telephone interface further including means for controlling transmission between the line and the handset,

man-machine interface equipment having a local power supply connected to a main power supply through an insulating transformer in which assembly power for the telephone interface is provided at one time by the telephone line and at another by the local power supply,

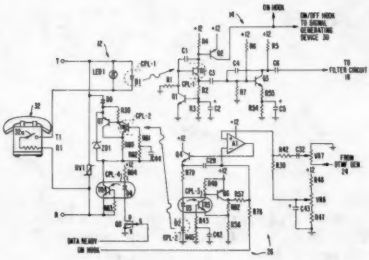
first galvanic insulation means permanently providing insulation between the local power supply and the telephone line and the telephone interface being connected to the man-machine interface equipment by message transmission channels comprising second galvanic insulation means.

**4,591,663**

## SERVO-LINEARIZED OPTO-ELECTRONIC ANALOG INTERFACE

**Thomas W. Sullivan, Sterling, Va., assignor to Trad, Inc., Washington, D.C.**

**Filed Nov. 17, 1983, Ser. No. 552,729**
**Int. Cl.[4] H04M *1/00***
**U.S. Cl. 179—2 C** **18 Claims**



1. A servo-linearized opto-electronic analog interface for interconnecting a signal generating device to a communications circuit, said interface comprising:

first opto-isolator means for optically transmitting a signal received from said communications circuit to said signal generating device; and

second opto-isolator means for optically transmitting a signal from said signal generating device to said communications circuit;

wherein said second opto-isolator means comprises a transmitting opto-coupler diode for optically transmitting said signal from said signal generating device, and a feedback opto-coupler diode connected in series with said transmitting opto-coupler diode for generating a feedback signal for application to said signal from said signal generating device, whereby to servo-linearize said signal from said signal generating device.

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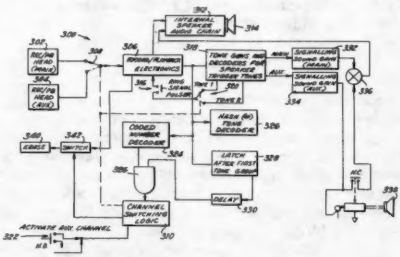
**4,591,664**

## MULTICHANNEL INTERACTIVE TELEPHONE ANSWERING APPARATUS

**Michael Freeman, 31 Cornwall La., Sands Point, N.Y.**

**Filed Nov. 23, 1982, Ser. No. 443,961**
**Int. Cl.[4] H04M *1/64***
**U.S. Cl. 179—6.06** **14 Claims**



1. A multichannel interactive telephone answering apparatus adapted for use with a two-way telephone line after capture thereof for enabling interactive communication with a caller over said telephone line for enabling caller selectible interaction with said answering apparatus in response to designated arming signals provided by said caller, said apparatus comprising, a multichannel information storage means capable of retrievably storing information for enabling said interactive

communication, said multichannel storage means comprising at least a main information channel and an auxiliary information channel and channel selection means for selectively switching at least between said main information channel and said auxiliary information channel, said channel selection means comprising signal detection means for detecting a designated arming signal provided by said caller over said captured telephone line and for providing an enable signal in response to detection of said designated arming signal, said channel selection means further comprising switching means responsive to said enable signal for providing said selective channel switching in response thereto, said multichannel information storage means further comprising playback means associated with each of said channels for providing selective playback of the information stored in said selected channel in response to said selection of a selected one of said channels, said selective playback providing said interactive communication, said multichannel storage means providing said playback from said main information channel in the absence of said detection of said designated arming signal, said multichannel information storage means comprising a multitrack magnetic storage medium for storing audio information thereon, said apparatus further comprising means for generating a different trigger signal to be stored on each of said main and auxiliary channels, and trigger signal detection means for detecting said trigger signal, said trigger signal detection means comprising means responsive to said trigger signal for generating a selective alert signal in response to caller provision of a predetermined designated arming signal, said selective alert signal corresponding to the person called, whereby interactive call screening and directing may be provided for uniquely alerting the person called.

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**4,591,665**

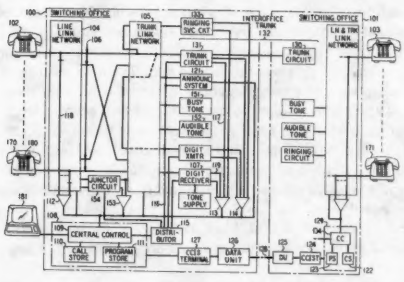
## METHOD AND APPARATUS FOR PROVIDING CALL TRACING SERVICE

**Robert W. Foster, Glen Ellyn; Rosanna M. Lottes, and Grant E. Swinehart, both of Naperville, all of Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jul. 12, 1983, Ser. No. 512,956**

**Int. Cl.[4] H04M *1/57*; H04Q *3/72***

**U.S. Cl. 179—18 FH** **20 Claims**




1. For use with a telephone system having a communications terminal and serving a plurality of stations, a method for providing a call tracing service, comprising the steps of:

responsive to a call from a calling one to a called one of said stations, storing the identity of said calling station in a memory associated with said called station; and

responsive to a predetermined code entered at said called station after the termination of said call, sending the stored identity of said calling station to said communications terminal.

**4,591,666**

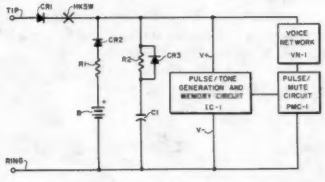
## PROTECTION CIRCUITRY FOR SUBSCRIBER'S TELEPHONE CIRCUIT EQUIPPED WITH REPERTORY MEMORY

**Eduard F. B. Boeckmann, Huntsville, Ala., assignor to GTE Business Communication Systems Inc., Northlake, Ill.**

**Filed Dec. 5, 1983, Ser. No. 558,129**

**Int. Cl.[4] H04M *1/274***

**U.S. Cl. 179—90 B** **1 Claim**




1. A subscriber's telephone circuit connected to a telephone line and including: memory means including calling signal information stored therein, connected to said telephone line;

a battery connected to said memory means providing current to maintain information stored in said memory means, during the on-hook condition of said telephone circuit and to provide back-up for interruption in line current received over said telephone line;

a capacitor connected to said battery and including circuit connections to said memory means, said capacitor charged from said battery to oppose transients occurring on said circuit connections to said memory means and thereby maintain the integrity of said calling signal information stored in said memory means; a resistor in series with said capacitor limiting the impedance of said charging circuit; a diode in parallel with said resistor permitting the flow of energy out of said capacitor in opposition to transients occurring on said circuit connection to said memory means; and there is further included a current limiting resistor in series with said battery to prevent battery surges.

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**4,591,667**

## DOME SPEAKER WITH CUT-OUT PORTIONS IN THE VOICE COIL BOBBIN

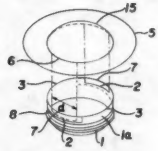
**Masanori Hino; Toshiji Kato, and Tatsuya Omori, all of Hirakata, Japan, assignors to Onkyo Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 28, 1985, Ser. No. 706,493**

**Claims priority, application Japan, Mar. 6, 1984, 59-32826[U]; Mar. 9, 1984, 59-34746[U]; Jun. 20, 1984, 59-91866[U]**

**Int. Cl.[4] H04R *9/04, 7/18, 9/06***

**U.S. Cl. 179—115.5 ES** **8 Claims**




1. A dome speaker comprising:

(a) a dome-shaped diaphragm formed of a high rigidity material and having an outer periphery;

(b) a voice coil bobbin secured at a top end thereof to the outer periphery of said diaphragm;

(c) a voice coil mounted about said bobbin; and

(d) variation means in said voice coil bobbin for partially varying the resonance conditions of said diaphragm which includes at least one cut-out portion provided at the top end of said voice coil bobbin and a sheet closing said cut-out portion.

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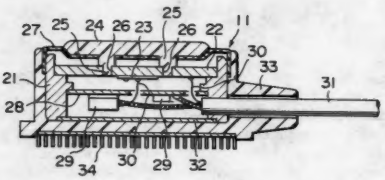
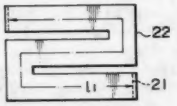
**4,591,668**

## VIBRATION-DETECTING TYPE MICROPHONE

**Keisuke Iwata, Tokyo, Japan, assignor to Iwata Electric Co., Ltd., Tokyo, Japan**

**Filed Jun. 20, 1984, Ser. No. 622,654**
**Claims priority, application Japan, May 8, 1984, 59-66748[U]; May 8, 1984, 59-66749[U]**
**Int. Cl.[4] H04R** *17/02, 7/26*
**U.S. Cl. 179—121 C** **12 Claims**




1. A vibration detecting microphone comprising:
a casing having one open end defining an opening;
a flexible diaphragm extending in a zigzag form and lying in a plane within the opening, the diaphragm having two ends secured at the opening;
a vibration pickup configured to contact the human body during use of the microphone and located on an external side of the diaphragm at a given distance therefrom, the pickup having at least one pair of spaced-apart feeler elements contacting the diaphragm; and
a piezoelectric element mounted on the diaphragm, the piezoelectric element being positioned between and out of contact with the feeler elements.

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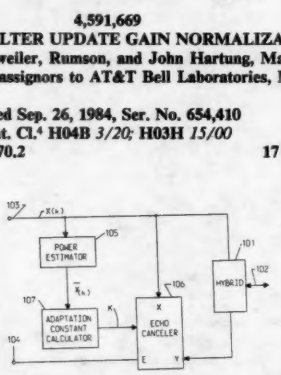
**4,591,669**

## ADAPTIVE FILTER UPDATE GAIN NORMALIZATION

**Donald L. Duttweiler, Rumson, and John Hartung, Marlboro, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Sep. 26, 1984, Ser. No. 654,410**
**Int. Cl.[4] H04B** *3/20;* **H03H** *15/00*
**U.S. Cl. 179—170.2** **17 Claims**




1. In an adaptive transversal filter of the type including:
means for generating a plurality of amplitude coefficient signals, said plurality of amplitude coefficient signals forming an impulse response, said means for generating said amplitude coefficient signals including controllable gain means responsive to a gain control signal for adjusting gain used in updating each of said plurality of amplitude coefficient signals;
means for generating said gain control signal including,
means for generating a power estimate of a signal incoming to said adaptive filter, and
means supplied with said power estimate for generating a normalized gain value as a first function of said power estimate and for controllably increasing said gain value for power estimate values which are greater than a predetermined threshold value, wherein said gain value is increased to be larger than that which would have been generated in accordance with said first function of said power estimate for said power estimate values which are greater than said predetermined threshold value, said normalized gain value being said gain control signal.

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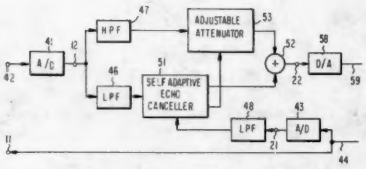
**4,591,670**

## ECHO CANCELLER AND ECHO SUPPRESSOR FOR FREQUENCY DIVISIONAL ATTENUATION OF ACOUSTIC ECHOES

**Yasuo Itoh, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Sep. 15, 1983, Ser. No. 532,628**
**Claims priority, application Japan, Sep. 30, 1982, 57-171681**
**Int. Cl.[4] H04B** *3/20*
**U.S. Cl. 179—170.2** **6 Claims**




1. An echo cancelling circuit responsive to a receive-in digital signal for feeding a receive-out signal to a receiver and responsive to a send-in digital signal delivered from a transmitter for producing a send-out signal, said echo cancelling circuit being furthermore for exempting said send-out signal from an echo signal which results from said receive-in digital signal, said receive-in digital signal comprising voice information which makes said receiver reproduce audible sound, said send-in digital signal comprising an acoustic signal when said transmitter is spoken to, said echo cancelling circuit comprising:
a first send-in digital filter responsive to said send-in digital signal for producing a first send-in component, said first send-in component comprising an acoustic signal component when said send-in digital signal comprises said acoustic signal;
a second send-in digital filter responsive to said send-in digital signal for producing a second send-in component;
a receive-in digital filter responsive to said receive-in digital signal for producing a first receive-in component, said first receive-in component comprising a voice information component when said receive-in digital signal comprises said voice information;
echo cancelling means responsive to said first send-in component and said first receive-in component for self-adaptively cancelling said echo signal to produce a first local digital signal component which is exempted substantially from said echo signal, said echo cancelling means being furthermore responsive to at least one of said first send-in component and said first receive-in component for pro-

ducing a control signal indicative of presence and absence of said acoustic signal component;

adjustable attenuating means responsive to said control signal for producing a second local digital signal component by attenuating said second send-in component; and

combining means for combining said first and said second local digital signal components into said send-out signal.

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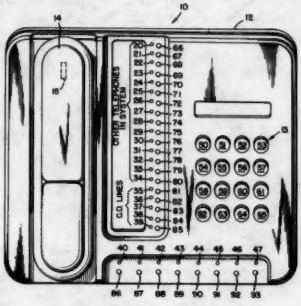
**4,591,671**

## TELEPHONE HAVING BUILT-IN TEST CAPABILITY FOR USE IN KEY TELEPHONE SYSTEM

**Edouard Pinede, Norwalk, and Serge Faublas, Monroe, both of Conn., assignors to PKS/Communications, Inc., Milford, Conn.**

**Filed May 31, 1984, Ser. No. 616,565**
**Int. Cl.[4] H04M 1/24**
**U.S. Cl. 179—175.2 R** **23 Claims**




16. A telephone for use in a key telephone system, said telephone comprising:

a housing;

audio processing circuitry mounted in said housing;

a handset containing an earphone and microphone coupled to said audio processing circuitry;

a plurality of switches mounted to said housing, including a keyboard for dialing outside calls and function switches for implementing features available in the key telephone system;

a plurality of indicator lamps adapted to indicate the status of features implemented by said function switches during the normal operation of said telephone;

a microprocessor;

means for coupling said microprocessor to said switches and indicator lamps;

means for entering said microprocessor, and hence said telephone, into a telephone test mode of operation;

means for individually accessing each of a plurality of telephone self-tests available during said telephone test mode to test the operation of a corresponding portion of said telephone; and

means for providing a visual indication on said indicator lamps to identify which one of said tests has been accessed.

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**4,591,672**

## LOUD SPEAKER ASSEMBLY

**Hiroshi Kato; Hitoshi Nakada, both of Saitama; Isao Nishiwaki, Tokyo; Toshio Teramoto, Tokyo; Keikichi Yagii, Tokyo, and Masahiro Niinomi, Tokyo, all of Japan, assignors to Pioneer Electronic Corporation and Japan Synthetic Rubber Co., Ltd., both of Tokyo, Japan**

**Filed Aug. 30, 1984, Ser. No. 645,706**
**Claims priority, application Japan, Aug. 31, 1983, 58-161092**
**Int. Cl.[4] H04R 9/02**
**U.S. Cl. 179—115.5 VC** **69 Claims**

1. A loud speaker assembly including members which are bonded together with a single adhesive compound, said adhesive compound comprising (a) at least one composition selected from the group consisting of alkyl acrylate, alkyl methacrylate, acrylic acid and methacrylic acid; (b) a copolymerized elastomer including 5 to 20 percent by weight of at least one member selected from the group consisting of (1) an acrylate or a methacrylate having an epoxy radical, (2) a hydroxyalkylmethancrylate or a hydroxyalkylacrylate, (3) a dialkylaminoalkyl acrylate or a dialkylaminoalkyl methacrylate, and mixtures thereof, said elastomer further including an unsaturated nitrile and at least one of butadiene and isoprene; and (c) an organic peroxide.

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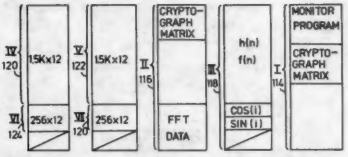
**4,591,673**

## FREQUENCY OR TIME DOMAIN SPEECH SCRAMBLING TECHNIQUE AND SYSTEM WHICH DOES NOT REQUIRE ANY FRAME SYNCHRONIZATION

**Lin-Shan Lee, Dept. of Electric Engineering, National Taiwan University, No. 1, Sec. 4, Roosevelt Rd., Taipei; Ger-Chih Chou, No. 10-1, Ping-Lang Rd., Hsing-Tien City, Taipei Hsien, and Ching-Sung Chang, No. 47-1, Lane 79, Ching-An Rd., Chung-Ho City, Taipei Hsien, all of Taiwan**

**Filed May 10, 1982, Ser. No. 376,607**
**Int. Cl.[4] H04K 1/04**
**U.S. Cl. 179—1.5 R** **9 Claims**




1. Apparatus, responsive to an audio frequency analog input signal applied thereto, for generating a scrambled audio frequency analog signal for transmission, said apparatus comprising:

input interface means, responsive to said analog input signal, for sampling said analog input signal at a predetermined rate, and generating digital data signals representative of said samples;

input switching buffer means, responsive to said digital data signals, for grouping said digital data signals into successive digital data frames (Xr) each representing a predetermined number (N) of samples, where $X_r(q)$; $r=0,1,2\ldots$; $q=1,\ldots N-1$;

input memory means, responsive to signals indicative of said digital data frames, for storing indicia of a predetermined number (2L) of successive digital data frames;

filter means, responsive to said stored data frame indicia, and signals indicative of a predetermined filter function $h(-Nr'+q)$, to calculate a time domain digital vector $U_{rR}$, where

$$U_{rR}(q) \cong \sum_{r'=-L}^{L} X(rR + Nr' + q)h(-Nr' - q) \text{ where } 0 \leqq q \leqq N-1,$$

the elements of said vector being indicative of the corresponding frequency (k) component value of the corresponding sample;

Fourier transform means, responsive to signals indicative of said digital vector $[U_{rR}(q),\ 0 \leqq q \leqq N-1]^T$, for generating a frequency domain digital vector $[Y_{rR}(k),\ K=0,\ 1\ldots N-1]^T$ where $\{Y_{rR}(k),\ k=0,1,\ \ldots\ n-1\}=DFT$

$\{U_{rR}((q-rR))_{modulo N}, q=0,1, \ldots N-1\}$, where DFT represents the Discrete Fourier Transform operator;

permutator means, responsive to signals indicative of said frequency domain digital vector $Y_{rR}(k)$, $k=0, 1 \ldots N-1$, and signals indicative of a predetermined N by N cryptographic matrix M, for generating a scrambled frequency domain digital vector $Y_r'=MY_r$

inverse Fourier Transform means, responsive to signals indicative of said scrambled frequency domain digital vector $Y_r'(k)$, $K=0, 1 \ldots N-1$, for generating a scrambled time domain digital vector $[y_{rR}(q), q=0, 1 \ldots N-1]^T$ where

$$\{y_{rR}(q), q=0,1, \ldots N-1\}=IDFT\{Y'_{rR}(k), k=0, 1 \ldots N-1\},$$

where IDFT is the inverse Discrete Fourier transform operator;

interpolation means, responsive to signals indicative of said scrambled time domain vector $[Y_{rR}(q), q=0, 1 \ldots N-1,]^T$ and signals indicative of a predetermined interpolation function f(q), for generating an interpolated scrambled digital signal $X'_{rR}(n)$, where:

$$X_{rR}(n) = \sum_{r'=Z-L+1}^{Z+L} f(n - r'R)y_{rR}(n_{modulo\ N})$$

where Z is the greatest integer less than q/R; and

output buffer means, responsive to signals indicative of said interpolated digital signal $X_{rR}'(n)$, for generating a scrambled audio frequency analog signal corresponding to said interpolated vector $X_{rR}'(q)$ for transmission.

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**4,591,674**

## PULSE GENERATOR

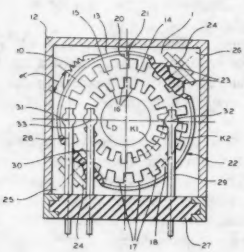
**Jochen Rose, Röthenbach, and Manfred W. Zebisch, Georgensgmünd, both of Fed. Rep. of Germany, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed Jun. 8, 1984, Ser. No. 618,644**

**Claims priority, application Fed. Rep. of Germany, Jun. 9, 1983, 3320769**

**Int. Cl.[4] H01H** *19/00*

**U.S. Cl. 200—11 DA** **18 Claims**



1. A pulse generator comprising

a drive shaft;

a rotor carried on said drive shaft and having a conductive pattern concentric with said drive shaft, said conductive pattern having a central continuous slip ring having a plurality of radially inward extending first teeth and a plurality of radially outward extending second teeth, said first teeth being spaced apart by a predetermined angular spacing, said second teeth being spaced apart by said predetermined angular spacing;

a fixed contact in continuous sliding engagement with said continuous slip ring;

a first fixed impulse contact positioned so as to slidingly engage and disengage said first teeth as said rotor rotates;

a second fixed impulse contact positioned so as to slidingly engage and disengage said second teeth as said rotor rotates;

said plurality of first teeth being staggered with respect to said plurality of second teeth, said first and second fixed impulse contacts being displaced relative to each other such that in both directions of rotation of said rotor said first fixed impulse contact does not engage one of said plurality of first teeth simultaneous with said second fixed impulse contact engaging one of said plurality of second teeth.

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**4,591,675**

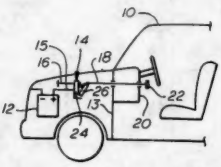
## EMERGENCY VEHICLE BATTERY CIRCUIT BREAKER

**Charles E. Sessum, 701 Fleming Ct., Houston, Tex. 77013**

**Filed Jun. 25, 1984, Ser. No. 624,223**

**Int. Cl.[4] H01H** *3/16, 17/08, 35/00*

**U.S. Cl. 200—52 R** **12 Claims**



1. A remotely operable electrical circuit breaker for use in vehicles comprising:

a non conductor base member;

a first conductive member mounted to said base member and having connected thereto means to connect said first conductive member to a battery terminal;

a second conductive member mounted to said base member and having connected thereto means to connect said second conductive member to an electrical apparatus, said second conductive member being spaced away from said first conductive member, whereby a non conductive gap is provided between said first and second conductive members;

a non conductive front member attached along one edge to said non conductive base member along one edge by a pivot and having a third conductive member mounted thereon and aligned with said gap whereby rotation of said non conductive front member about said pivot toward said non conductive base member places said third conductive member into said gap and into electrical contact with said first and second conductive members forming an electrical circuit said conductive members being held in contact by friction,

wherein said non conductive front member and said non conductive base member form an enclosure to protect said contacts when said contacts are engaged, and whereby rotation of said non conductive front member about said pivot away from said non conductive base member removes said third conductive member from said gap and discontinues electrical contact with said first and second conductive members, thereby breaking said electrical circuit; and

a cable means attached to said non conductive front member to provide for remote manual rotation of said non conductive front member toward and away from said non conductive base member.

4,591,676

## INERTIA SWITCH IMPACT SENSOR

Peter R. Jackman, and Paul P. Stratton, both of Hampshire, England, assignors to First Inertia Switch Limited, Hampshire, England

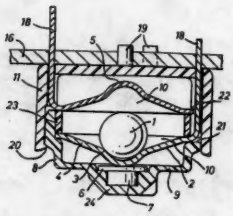
PCT No. PCT/GB84/00074, § 371 Date Nov. 2, 1984, § 102(e) Date Nov. 2, 1984, PCT Pub. No. WO84/03585, Date Sep. 13, 1984

PCT Filed Nov. 2, 1984, Ser. No. 668,269

Claims priority, application United Kingdom, Mar. 10, 1983, 8306581

Int. Cl.[4] H01H *35/14*

U.S. Cl. 200—61.45 M 6 Claims



1. An inertia switch impact sensor, such as for vehicle crash detection, comprising:

a ferromagnetic ball (1);

a dished first contact (2) having a circular portion (3) of smaller diameter than the ball (1), for supporting the ball (1) in a rest position, and an upwardly inclined outer portion (4) extending from the circular portion (3);

a substantially circular second contact (5) for engagement by the ball (1), on movement of the ball (1) away from its rest position, to complete an electrical path between the first and second contacts (2 and 5); and

a magnet (7) disposed below the ball (1) and spaced from the first contact (2);

characterized in that:

a non-magnetic shim (6) is disposed between the first contact (2) and the magnet (7); and

the magnet (7) is supported by a support (8) having pressing means for causing the magnet (7) to press the shim (6) against the first contact (2) so as to precisely space the magnet (7) relative to the first contact (2).

4,591,677

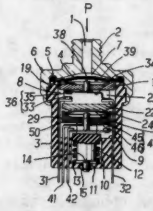
## THREE-FUNCTION PRESSURE SWITCH

Hisatoshi Hirota, Hachioji; Toyoyuki Hara, Fuchu, and Masaichi Kawahata, Hachioji, all of Japan, assignors to TGK Company, Limited, Hachioji, Japan

Filed Feb. 7, 1985, Ser. No. 699,398

Int. Cl.[4] H01H *35/34*

U.S. Cl. 200—83 J 2 Claims



1. A three-function pressure switch comprising a casing including an upper casing portion provided with a center coaxial pressure inlet and a pressure receiving chamber and a lower casing portion integrally secured to said upper casing portion, a diaphragm pinched at the periphery between said upper and lower casing portions, a first resilient disc disposed in contact with the undersurface of said diaphragm for warping subjected to pressure from said chamber through said diaphragm, a first piston receiving said first resilient disc and vertically movable in response to warping of said disc, a holder disposed within said lower casing portion for vertical movement to engage and separate from said first piston, a second pistion disposed below said holder, a second resilient disc received in said second piston for warping in response to vertical movement of said holder, a spring-loaded piston body disposed below said second piston for vertical movement, a first electrical switching section adapted to be opened and closed by said first resilient disc, a second electrical switching section adapted to be opened and closed by said second resilient disc and first and second terminal means electrically connected to said first and second electrical switching sections, respectively.

4,591,678

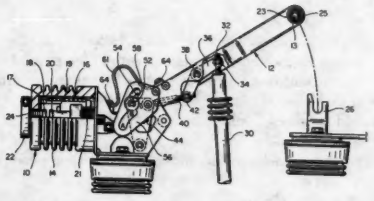
## HIGH POWER SWITCHING APPARATUS

Simon Yin, Fremont, Calif., assignor to Square D Company, Fremont, Calif.

Filed Oct. 26, 1984, Ser. No. 664,987

Int. Cl.[4] H01H *33/66*

U.S. Cl. 200—144 B 9 Claims



1. A high power switching apparatus comprising:

a vacuum switch means having a fixed electrical contact and a movable electrical contact;

bias means for biasing said movable contact towards said fixed contact;

an air switch having a knife blade assembly and an electrical terminal for engaging said knife blade assembly;

a positive interlock mechanism disposed between said switches, comprising;

an actuating mechanism for applying a continuous one stroke force for first relieving the bias of said bias means; then retracting said movable contact from said fixed contact, and then disengaging said knife blade assembly from said terminal; said steps occurring in sequence during a disconnect mode; and during the connect mode first connecting the knife blade assembly and terminal then advancing said movable contact into position against said fixed contact, and then applying a bias force from said bias means to force said movable contact securely against said fixed contact.

4,591,679

## LOADBREAK SWITCH ACTUATOR

Miguel B. Yamat, Franklin, and Edwin A. Link, Waukesha, both of Wis., assignors to RTE Corporation, Waukesha, Wis.

Filed Mar. 16, 1984, Ser. No. 590,392

Int. Cl.[4] H01H *33/66*

U.S. Cl. 200—144 B 21 Claims

17. A manually actuable load break switch actuator for opening and closing a vacuum switch, said actuator comprising

plate means adapted to be mounted on the vacuum switch,

a lever having one end pivotally connected to said plate means,

means connected to said lever intermediate the ends thereof

for operatively connecting said lever to the vacuum switch,

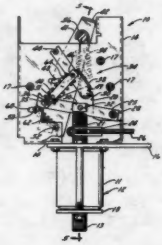
a toggle mechanism connected to the other end of said lever for moving said lever between open and closed positions with respect to the switch,

said toggle mechanism including

a first link having one end pivotally connected to said plate means

a second link having one end pivotally connected to said other end of said lever,

a pivot pink pivotally connecting said other end of said second link to said first link,



a manually operable handle pivotally connected to said plate means for movement from one side of the pivotal connection of said first link to said plate means to the other side of said pivotal connection to said plate means.

a tension spring connecting said handle to the other end of said first link,

and pin means biased to move to a locking position with respect to said lever when said lever is moved to the switch open position,

said pin means being located in the path of motion of said handle whereby the switch closing motion of said handle will move said poin means away from said locking position with respect to said lever to allow said lever to close the switch.

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**4,591,680**

## ISOLATING SWITCH

**Friedrich Pinnekamp, Siggenthal-Station, Switzerland, assignor to BBC Brown, Boveri & Co., Ltd., Switzerland**

**Filed Oct. 24, 1984, Ser. No. 664,343**

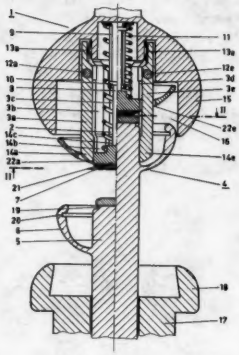
**Claims priority, application Switzerland, Nov. 11, 1983, 6085/83**

**Int. Cl.[4] H01H *33/12***

**U.S. Cl. 200—146 R** **5 Claims**

1. Isolating switch containing an essentially rotationally symmetric fixed contact member (**1**) having a centrally arranged trailing contact (**2**) ending in a contact member (**7**), and a ring, coaxially surrounding the fixed contact member (**1**), of rated-current fingers (*3a–h;* a likewise essentially rotationally symmetric movable contact member (**4**) having a centrally arranged contact rod (**5**) and a shielding electrode (**6**) both of which are movable along with said movable contact member (**4**), said shielding electrode (**6**) coaxially surrounds at a distance at least the region of said contact rod (**5**) which is located directly behind the end of said movable contact member (**4**) facing said fixed contact member (**1**),

characterised in that said rated-current fingers (*3a–h*) are arranged and constructed in such a manner that their end members (*14a–h*) contacting said movable contact member (**4**) are positioned between said contact rod (**5**) and



said shielding electrode (**6**) during the switching-on process.

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**4,591,681**

## MICROWAVE OVEN DISPLAY POWER SUPPLY

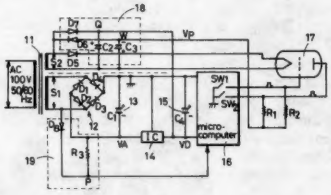
**Hideyuki Akao, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Mar. 22, 1984, Ser. No. 592,354**

**Claims priority, application Japan, Mar. 26, 1983, 58-51194**

**Int. Cl.[4] H05B *6/66, 39/00***

**U.S. Cl. 219—10.55 B** **8 Claims**




1. A microwave oven comprising:

a power supply receiving commercial AC voltage;

microwave generating means, powered by said power supply, for developing microwave energy;

a fluorescent display displaying information at a plurality of display positions, said fluorescent display including a heater, an anode, and grid means for erasing a display state of said fluorescent display at selected display positions;

control means, driven by said power supply, for controlling the application of voltage to said anode and grid means of said display;

said power supply including,

a rectifier for converting said commercial AC voltage to supply DC power to said control means,

means for rectifying said commercial AC voltage to form a rectified half-wave voltage,

means, responsive to said means for rectifying, for supplying only one-half cycle of said rectified voltage to said heater of said fluorescent display,

voltage doubling means, responsive to said means for rectifying, for doubling said rectified voltage to form a display erase potential having a magnitude greater than the magnitude of said rectified voltage supplied said heater by said means for supplying;

said control means controlling the supply of said display

erase potential to said anode and grid means to selectively erase display positions of said fluorescent display to display information at other selected display positions.

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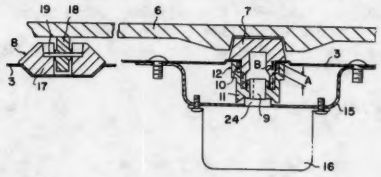
**4,591,682**

## MICROWAVE OVEN WITH IMPROVED TURNTABLE DRIVE

**Koichi Takeuji, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Jul. 17, 1984, Ser. No. 631,730**
**Claims priority, application Japan, Jul. 28, 1983, 58-140197**
**Int. Cl.⁴ H05B 6/64**
**U.S. Cl. 219—10.55 F** **4 Claims**




1. A microwave oven, comprising:
a turntable;
a drive unit for rotating said turntable; and
a coupling connecting an output shaft of said drive unit to said turntable;
said coupling comprising:
a first coupling element having an upper portion engaging the underside of the center of said turnable; and
a second coupling element having an upper portion comprising a plurality of prongs engaging a lower portion of said first coupling element therebetween and a lower portion engaging said output shaft;
said oven including a bottom plate formed with a choke opening having a choke portion extending downwardly from the back plate, said lower portion of said first coupling element being inserted through said choke opening into engagement with said second coupling element.

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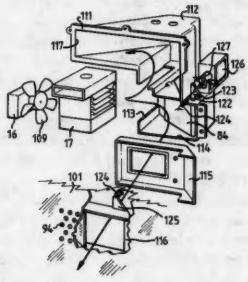
**4,591,683**

## MICROWAVE OVENS AND METHODS OF COOKING FOOD

**Kenneth I. Eke, Sanderstead, England, assignor to Microwave Ovens Limited, Shirley, England**

**Continuation-in-part of Ser. No. 513,296, Jul. 13, 1983, Pat. No. 4,508,947. This application Feb. 19, 1985, Ser. No. 702,597**
**Int. Cl.⁴ H05B 6/78**
**U.S. Cl. 219—10.55 B** **10 Claims**




1. A portable microwave oven designed to be powered from a domestic power socket having a standard maximum power rating comprising two side walls, a base, a top wall, a rear wall and a closable front door together defining an oven cavity, a magnetron for supplying microwave power to the said cavity, a blower motor for generating a flow of cooling air for said magnetron, a rotatable turntable on the base of said cavity for supporting food thereon, a port in one of said side walls of said cavity, a vent in the rear wall, a shutter movable between an open position in which air is blown through the port and into said cavity by the blower motor and a closed position in which said shutter prevents air delivered by said blower motor from reaching said cavity, a by-pass duct extending from an inlet adjacent the magnetron to an outlet at the rear of the oven, thermal heating means capable of heating the air within said oven cavity, and control means operative to supply continuous microwave power to said cavity simultaneously with the supply of thermal power to said cavity so that the microwave power heats the inside of the food while the thermal power dissipates the resulting moisture and browns the external surface of the food, said thermal heating means comprising an electrical heating element and fan means for recirculating air over said element and through said cavity, said fan means causing a forced flow of air heated by said electrical heating element to enter said cavity from one side thereof, to pass over said turntable and thereafter leave said cavity from the other side thereof, said shutter being in the closed position thereof when said electrical heating element is energized so that air blown over the magnetron by the blower motor passes along the by-pass duct to atmosphere, and said shutter being in the open position thereof to vent the cavity when said electrical heating element is de-energized so that air blown over the magnetron by the blower motor divides into two paths one of which passes through the port of the cavity and thence through the vent to atmosphere and the other of which passes along the by-pass duct to atmosphere.

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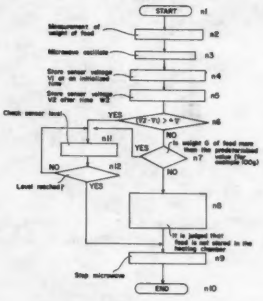
**4,591,684**

## COOKING COMPLETION DETECTION IN A COOKING APPLIANCE

**Takeshi Tanabe, Higashiosaka; Kuniyoshi Fujikawa, Sakai; Takatoshi Yasuda, Yamatokoriyama, and Nobuo Takeoka, Osaka, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 16, 1985, Ser. No. 723,869**
**Int. Cl.⁴ H05B 6/68**
**U.S. Cl. 219—10.55 B** **4 Claims**




1. A cooking appliance in which food placed in a heating chamber is cooked by a heating operation, comprising:
(a) scale means for weighing food;
(b) detector means for determining the completion of the cooking of said food as a function of changes in the physical characteristics of the food including sensor means for continuously measuring said physical characteristics and generating characteristic signals, the respective character-

istic signals having levels representative of the degree of cooking achieved;

(c) timer means for sampling a characteristic signal generated by said sensor means at the initiation of a cooking cycle and at a predetermined time following said initiation;

(d) first comparator means for comparing the characteristic signal at initiation with the characteristic signal at said predetermined time and determining when the difference between the levels of said signals is greater or less than a predetermined value, said comparator means generating a sensor enable signal to said sensor means when said difference is greater than said value on a comparator enable signal when said difference is less than said value, said sensor enable signal instructing said sensor means to continue sensing said changes in said physical characteristics;

(e) second comparator means responsive to said comparator enable signal for comparing the weight of food determined by said scale means with a predetermined weight, generating a power OFF signal when said weight is less than said predetermined weight or generating an instruction to said sensor means to continue sensing said changes in physical condition when said weight is greater than said predetermined weight; and

(f) control means responsive to either said power OFF signal from said second comparator means, or the completion of cooking as determined by said detector means, for terminating the cooking operation.

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**4,591,685**

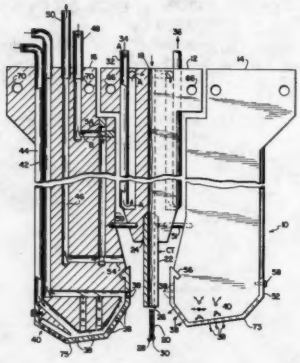
## NARROW GAP WELDING TORCH

**Gary W. Hinger, Kent, and Richard S. Crial, Federal Way, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Oct. 12, 1983, Ser. No. 541,037**

**Int. Cl.[4] B23K *9/16***

**U.S. Cl. 219—74** **16 Claims**



1. A narrow gap welding torch for welding in a narrow gap formed by opposing walls of members to be welded, comprising:

a center bar having a bore therein for passing a consumable center electrode therethrough into a welding arc;

a first gas bar disposed adjacent said center bar on one side thereof and having first means for delivering shielding gas to an area in said narrow gap being welded;

a second gas bar disposed adjacent said center bar on another side thereof and having second means for delivering shielding gas to the area in said narrow gap being welded; and

wherein first and second gas bars each have coolant passageways formed therein for circulating liquid coolant therethrough and said center bar has a liquid coolant passageway formed therein for circulating liquid coolant therethrough;

said first and second shielding gas delivery means each including at least a first outlet for delivery of a first shielding gas directly at said welding arc and at least a second outlet for delivery of a second shielding gas to said opposing walls.

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**4,591,686**

## FEEDER FOR REVOLVING ELECTRODE

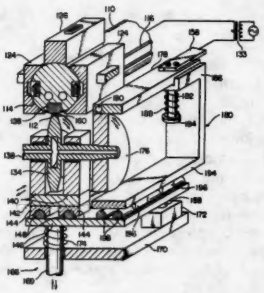
**Kenji Matsuno, and Kazuma Kuse, both of Yokohama, Japan, assignors to Toyo Seikan Kaisha Limited, Tokyo, Japan**

**Filed May 1, 1984, Ser. No. 607,112**

**Claims priority, application Japan, May 9, 1983, 58-79433; Aug. 5, 1983, 58-142456**

**Int. Cl.[4] B23K *11/06***

**U.S. Cl. 219—81** **8 Claims**



1. An electrical resistance welding machine for electrical resistance welding of an article to be welded between a revolving electrode and another electrode opposite thereto, comprising:

a revolving electrode having a cylindrical peripheral electrode surface and having an axial electrically conductive shaft integral therewith;

an other electrode opposite said revolving electrode for being electrically connected to one terminal of an electrical power supply;

means for rolling said revolving electrode in a rolling direction on the article to be welded with the article to be welded between said revolving electrode and said other electrode;

an electrically conductive feeder rotor mounted on said shaft so as to be in electrical contact, and be carried in said rolling direction therewith, having a cylindrical peripheral rotor surface radially spaced from and surrounding said shaft, electrically connected to said electrode surface through said shaft; and

an electrically conductive feeder plate for being electrically connected to an other terminal of the electrical power supply, extending in said rolling direction, positioned so that said peripheral rotor surface rolls thereon in pressing electrical contact therewith in said rolling direction without substantial slip when said revolving electrode rolls on the article to be welded in said rolling direction, whereby the one and the other terminals of the power supply are electrically connectable through said feeder plate, said feeder rotor, said revolving electrode, the article to be welded and said other electrode, series connected to each other in the named order.

4,591,687

## ELECTRICAL RESISTANCE-PRESSURE WELDING PROCESS FOR WELDING PARTS OF WORKPIECES MADE OF ALUMINUM MATERIALS AND AN APPARATUS AND ELECTRODE THEREFOR

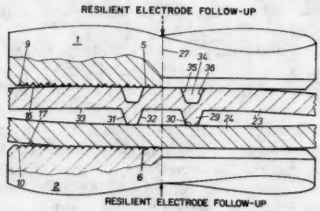
**Werner Urech, Kaiselstuhl, Switzerland, assignor to Paul Opprecht, Bergdietikon, Switzerland**

**Filed Feb. 23, 1983, Ser. No. 469,033**

**Claims priority, application Switzerland, Mar. 4, 1982, 1325/82**

**Int. Cl.⁴ B23K *11/00***

**U.S. Cl. 219—93** **18 Claims**




1. In an electrical resistance-pressure-welding process for welding together parts of aluminum metal and/or its alloys carrying a surface layer of aluminum oxide, by a welding current supplied through opposed electrodes, each provided with a resilient electrode follow-up, in which the parts to be welded together are first pre-pressed together by means of said resilient follow-up before the welding current is switched on and such pressure is continuously maintained during the flow of welding current, the improvement wherein at least one of the surfaces of such parts facing the electrodes is superficially deformed plastically during said pre-pressing without penetrating the part thickness to thereby disrupt the surface-layer of aluminum oxide at the locations of deformation and bring substantially unoxidized metal of said part thus exposed into direct pressure contact with the adjacent electrode, the extent of the resultant direct contact between the electrode and the substantially unoxidized metal being sufficiently large that contact-resistance across the interface between each such electrode and the corresponding part is significantly lower than the resistance at the point of weld between the parts, and the duration of welding and welding current are controlled in relation to each other so that the temperature of such electrode at said interface is below the alloying-on temperature of the metal in contact therewith.

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4,591,688

## SYSTEM AND METHOD FOR PROCESSING A WORK PIECE BY A FOCUSSED ELECTRON BEAM

**Dieter Koch, Stuttgart, and Friedemann Noller, Herrenberg, both of Fed. Rep. of Germany, assignors to Institut für Kerntechnik und Energiewandlung e.v., Fed. Rep. of Germany**

**Filed Jul. 29, 1983, Ser. No. 518,351**

**Claims priority, application Fed. Rep. of Germany, Aug. 2, 1982, 3228846; Nov. 5, 1982, 3240887**

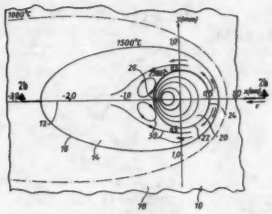
**Int. Cl.⁴ B23K *15/00***

**U.S. Cl. 219—121 EV** **30 Claims**

1. In a method of processing a work piece by means of an electron beam impinging on said work piece along a processing path having a predetermined direction of movement, said electron beam further being deflected in accordance with a superimposed modulation curve relative to said processing path, said modulation curve having a front surface and a rear surface, the improvement comprising the steps of

moving said electron beam step by step along a sequence of points together constituting said modulation curve, and

imparting to said modulation curve mirror symmetry relative to a tangent of said processing path, so that said modulation curve defines a first modulation curve section having a minimal deflection along a direction transverse to the tangent of said processing path, and a second modulation curve section deflected along said transverse direction more strongly than said minimal deflection, and



wherein said second modulation curve section has a velocity component in said front surface pointing backwards as seen in a direction opposite to the direction of movement of said electron beam.

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4,591,689

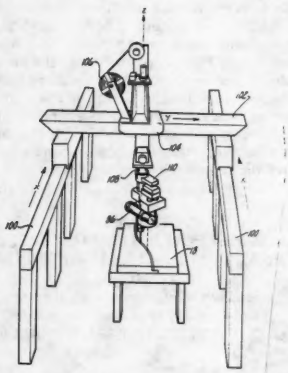
## ADAPTIVE WELDING GUIDANCE APPARATUS

**Ronald D. Brown, Mapleton, and James D. Waters, Jr., Montgomery, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Feb. 25, 1985, Ser. No. 705,159**

**Int. Cl.⁴ B23K *9/12***

**U.S. Cl. 219—124.34** **14 Claims**



1. An adaptive welding apparatus for guiding a welding torch along a weld groove, comprising:

first means for moving a sensing element along a preselected pathway extending across said weld groove, sensing the weld groove cross sectional configuration, and delivering signals in response to the position and confituration of the weld groove cross secton;

second means for receiving said signals, determining relative locations of preselected points on said weld groove, and computing a relative location of the center of area of said weld groove cross section; and

third means for computing a guidance point as a function of said center of area irrespective of the cross sectional configuration of said weld groove, and controlling the lateral movement of said welding torch in a direction toward said guidance point.

**4,591,690**

## WELDING ELECTRODE HOLDER

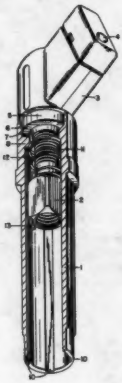
**Joseph J. A. Van Reijmersdal, Dordrecht, Netherlands, assignor to De Vlamboog B.V., Hoofddorp, Netherlands**

**Filed Nov. 13, 1984, Ser. No. 671,162**

**Claims priority, application Netherlands, Nov. 14, 1983, 8303890**

**Int. Cl.[4] B23K** *9/28*

**U.S. Cl. 219—138** **6 Claims**



1. An electrode holder comprising an electrically insulating tubular handle having at one end an axially outward directed bearing surface, an electrode-clamping head member rotatably seated on such bearing surface, a cable connector which is axially slidable in the tubular handle and which has an axially-extending threaded pin portion screwed into a portion of the head member, and a coil spring which surrounds such pin portion and which is arranged to retract the cable connector into the tubular handle so as to hold the head member against said bearing surface, characterized in that a radially-effective pressure spring means is arranged to act between one side of the cable connector and the inner wall of the tubular handle so as to press the other side of the cable connector against the inner wall of the tubular handle.

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**4,591,691**

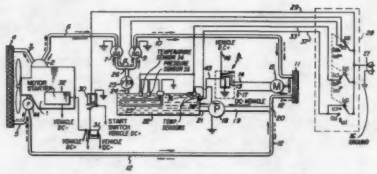
## AUXILIARY ELECTRIC HEATING SYSTEM FOR INTERNAL COMBUSTION ENGINE POWERED VEHICLES

**Edward A. Badali, 970 Wintergreen Ave., Hamden, Conn. 06514**

**Filed Oct. 29, 1984, Ser. No. 665,983**

**Int. Cl.[4] H05B** *1/02;* **B60L** *1/10;* **H01J** *9/00*

**U.S. Cl. 219—202** **20 Claims**



1. In an internal combustion engine vehicle coolant flow system which includes an internal combustion engine, coolant circulator pump for pumping coolant heated by the engine from the engine, a heating radiator for transferring heat contained in the coolant to an enclosed area of the vehicle, electric blower means for increasing the rate of heat transfer by the radiator to the enclosed area and a first piping by which the coolant flow is established from the coolant circulator pump to the radiator and a second piping by which the coolant flow is established from the radiator to the engine, the improvement comprising an auxiliary heating system including:

a electric pump, connected at its input side to the second piping for receiving coolant fluid therefrom,

a check valve having an input and an output end,

a conduit for connecting said check valve to the output end of said electric pump, said check valve being oriented so that its input end receives fluid from the electric pump for flow therethrough to its output end and that it will prevent fluid flow back through it to the electric pump,

a first normally open electrically controlled valve single path connected at one end to the check valve output and at the other end to the first piping,

a second normally open electrically controlled valve single path connected at one end to the check valve output and at the other end to the first piping at a point spaced from the connection of said first valve with the first piping, there being no direct through connection in the first piping between where the two single path valves join the piping so that fluid flowing from the coolant circulator pump to the radiator as recited earlier must pass serially through the valve in flowing through the first piping,

said first and second valves normally being open to fluid flow, and being closed to interrupt fluid flow when electrically excited,

a electric heating element, mounted sealingly in the conduit and adapted for receiving electrical current from without the conduit, for providing heat to the coolant flowing therethrough,

a temperature sensing element connected for interrupting electrical current flow through the electric heating element when a predetermined coolant temperature in the auxiliary heating system is reached, mounted for sensing coolant temperature in said auxiliary heating system,

means for receiving a first electrical current and,

means for switching the first electrical current on or off to the electric heating element,

means for selectively switching the first electrical current through the normally open valves and through the electric pump in any order of options, among options comprising;

(a) no current through the electric pump and no current through either valve so that they remain open for permitting unimpeded coolant flow through the internal combustion engine coolant flow system by the coolant circulator pump,

(b) current through the electric pump yet not through either valve so that coolant driven through the check valve by the electric pump takes two paths, and passes through the first valve then the engine by way of the first piping and returns to the electric pump by way of the second piping, while it sumultaneously passes through the second valve, then the radiator by way of the first piping after which it returns to the electric pump by way of the second piping,

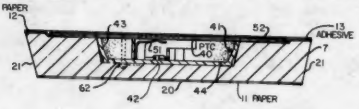
(c) current through the electric pump and the second valve to exclusion of the first valve so that coolant driven through the check valve by the electric pump passes through the first valve then the engine by way of the first piping and returns to the electric pump by way of the second piping and is restricted from flow to and through the radiator by the closed, second valve, and

(d) current through the electric pump and the first valve to exclusion of the second valve so that coolant driven through the check valve by the electric pump passes through the second valve, then the radiator by way of the first piping after which it returns to the electric pump by way of the second piping, and is retricted from flow to the engine by the closed first valve.

## 4,591,692
## BATTERY WARMER

Lawrance W. Wightman, 3 Ridgecreek, St. Louis, Mo. 63141

Filed Oct. 3, 1983, Ser. No. 538,522
Int. Cl.[4] H05B *1/00*
U.S. Cl. 219—209 2 Claims




1. A battery warmer for warming a vehicle battery having a flat side, said battery being in a vehicle compartment, said warmer comprising a molded block of polyurethane foam having a flat bottom surface, a top surface with a heater-receiving well, and side surfaces extending from the edges of said bottom surface to the outer margins of said top surface; a PTC heater element mounted in said well; a metal plate, connected in heat transfer relation to said PTC element and extending in substantially flush relation to said upper surface; electrical means for connecting said PTC element to a source of electric current, and means for mounting said warmer to said flat side of said battery, said mounting means comprising a strap embracing said battery and said warmer and slides, mounted on said strap on both sides of the battery, for sliding toward the said warmer beyond the edge of the battery adjacent the said warmer to tighten the strap after it has been first tightened manually, opposite of said side surfaces of said molded block and said bottom surface defining at their respective arris a notch, said notches being aligned and receiving said strap.

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## 4,591,693
## COMPANION WARMER

Carl A. Pike, 2341 Duane Rd., Palm Springs, Calif. 92262

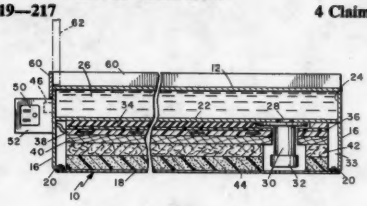
Filed Feb. 13, 1985, Ser. No. 701,295
Int. Cl.[4] A47C *21/04*
U.S. Cl. 219—217 9 Claims

1. In combination, (a) an elongate soft resilient polymer body (22) so constructed and configured as to lie, when in use, along side a body of a human user, said polymer body having a bottom and a top and two sides, and being approximately the length of the body of the user, excluding the user's neck and head, having sidewalls, and having a thickness from bottom to top approximately equal to the thickness from front to back of a user's body, said polymer body being so configured and constructed as to resiliently resist folding and retain its normal elongate configuration; and (b) at least one heater so constructed as to warm sidewalls of said polymer body, means for connecting the heater to a source of electric power (30), means for controlling the temperature of the heater, and means for securing said heater adjacent said body (32).

## 4,591,694
## HEATED BED MODULE FOR ANIMALS

John A. Phillips, San Diego, Calif., assignor to Zoological Society of San Diego, San Diego, Calif.

Continuation of Ser. No. 489,200, Apr. 27, 1983. This application Apr. 26, 1985, Ser. No. 727,847
Int. Cl.[4] A01K *1/035*
U.S. Cl. 219—217 4 Claims




1. A heated bed module for animals, comprising:
a unitary, substantially rigid box-like frame having a planar animal supporting top panel, with surrounding side walls depending therefrom, and a removable bottom panel secured to said side walls;
a rigid inner panel spaced below said top panel and sealed to said side walls to enclose a shallow liquid containing chamber;
said chamber having access means for filling and draining said chamber;
said frame having a lower housing extending below said chamber and enclosed by said bottom panel;
a rigid support member within said lower housing spaced above said bottom panel;
a thermally conductive electrical insulation layer immediately below said inner panel;
a thermostatically controlled heater mounted between said support member and said electrical insulation layer;
thermal insulation substantially filling said lower chamber below said support member;
said top panel, said inner panel, and said support member being substantially parallel to one another and having substantially equal surface areas.

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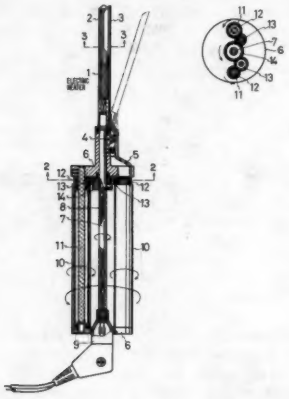
## 4,591,695
## ROTATABLE BARREL CURLING IRON

Taro Inoue, 3-5-20, Kitagata, Okayama, Japan

Filed May 18, 1984, Ser. No. 611,890
Int. Cl.[4] H05B *3/00;* A45D *1/04*
U.S. Cl. 219—225 1 Claim

1. A curling iron comprising:
an elongated handle structure having a central axis, said handle structure comprising:
a pair of spaced apart holders;
a pair of spaced apart shafts coupling said holders together;
a central shaft provided along said central axis and between said shafts, said central shaft being freely rotatably supported in said holders;
two gripping portions, said gripping portions being supported on respective ones of said pair of shafts for free rotation thereabout; and
gear means provided between the gripping portions and said central shaft, said gear means being arranged and configured to drivingly rotate said central shaft in a same direction of rotation as the direction of rotation of said two gripping portions about said pair of shafts;
a barrel coupled to said central shaft for rotation therewith relative to said handle structure;
a heater provided in said barrel for heating said barrel to a curling temperature;
a clampling tongue pivotally coupled to said handle structure for movement toward and away from said barrel; and

means for selectively pivotally moving the tongue relative to said barrel;



whereby when said curling iron handle structure as a whole is rotated in one direction, said barrel rotates in an opposite direction.

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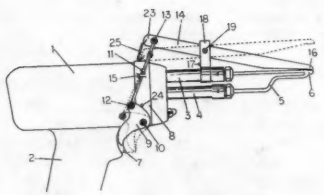
**4,591,696**

## ELECTRIC SOLDERING GUN WITH WORK CLAMPING DEVICE FOR THE SOLDERING TIP

**Mark B. Eisen, 567 Deloraine Avenue, Toronto, Canada M5M 2C5**

**Filed Sep. 26, 1984, Ser. No. 654,414**
**Int. Cl.[4] B23K *3/02*; H05B *3/00***
**U.S. Cl. 219—230** **1 Claim**



1. A soldering gun having an approximately cylindrical housing, cylindrical terminal posts projecting axially from a front end of the housing supporting a heating element extending parallel to the cylindrical terminal posts, a handle extending at approximately a right angle to the axis of the housing from a lower side of the housing, a heating element-actuating trigger at the upper end of a front side of the handle for activating the heating element, a light on the front end of the housing which illuminates the tip of the heating element when the heating element-actuating trigger is depressed, and a clamping device comprising:

a clamping member pivotally supported on one of the cylindrical terminal posts of the soldering gun;

a clamping member-actuating trigger pivotally supported adjacent to the heating element-actuating trigger of the soldering gun; and

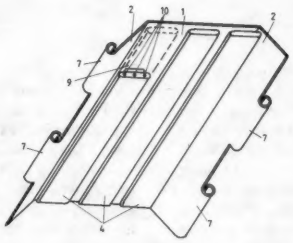
a connecting rod connecting the clamping member-actuating trigger to the clamping member so that the clamping member moves toward the heating element as the clamping member-actuating trigger is depressed.

**4,591,697**

## INFRARED-RADIATING EQUIPMENT WITH CERAMIC RADIATORS

**Hans Lexer, Freden, Fed. Rep. of Germany, assignor to Manfried Steinmetz, Northeim, Fed. Rep. of Germany**

**Filed Nov. 18, 1983, Ser. No. 553,485**
**Claims priority, application Fed. Rep. of Germany, Dec. 3, 1982, 3244793**
**Int. Cl.[4] H05B *3/48***
**U.S. Cl. 219—348** **8 Claims**



1. Infrared-radiating appartus comprising: ceramic radiators; reflectors supporting said radiators; hinged joint means at edges of said reflectors and having sleeve means; and connecting pin means passing through said sleeve means for hingedly interconnecting a plurality of reflectors to form a predetermined geometrical shape supporting said radiators in a predetermined arrangement; said reflectors having sloping walls connected to a correspondingly wide rear portion; said rear portion having groups of openings for mounting said radiators; said reflectors having auxiliary openings for passing power lines of said radiators; said sleeve means comprising sleeve members mutually displaced at a distance from each other so that sleeves of another reflector can be inserted therebetween to form a hinged connection between a plurality of reflectors; rod-shaped members inserted through said sleeves for assembling a plurality of reflectors in sequence; reflectors being connectable hingedly next to and behind each other; said radiators comprising elongated rectangular elements having a ceramic body with heat conductors embedded therein and terminating into power-supply lines at ends of said radiators; said radiators having supports comprised of ceramic material; attaching connecting wires being passed through said supports; each radiator having two supports on its rear surface; said attaching connecting wires being passed through openings in said reflectors and being twisted together in back of the reflectors; and power-supply lines passed through said auxiliary openings and connected to electric terminals in back of said reflectors.

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**4,591,698**

## ELECTRIC DUAL AND QUICK COOKING UTENSIL

**Hong-Tsuan Chang, 83, Sec. 2, Lin-Shen Road, Tainan, Taiwan**

**Filed Mar. 12, 1984, Ser. No. 588,458**
**Int. Cl.[4] F24C *7/00***
**U.S. Cl. 219—400** **3 Claims**

1. An electric dual and quick cooking utensil having an open outer casing, an open inner pot movably provided in the outer casing, a hollow base integrally coupled with a lower portion of the outer casing, and a hood having a hand grip and a plurality of air vents detachably coupled with an upper edge of the outer casing, comprising:

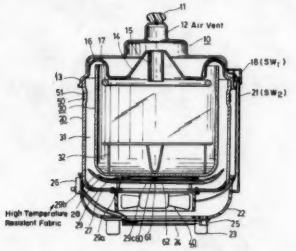
a first contact switch of magnetic type installed on a back side of the hood;

an inner hub of stainless steel provided within the hood;

a hollow round pipe fixed in a middle portion of said inner hub;

a first heater disposed under a lower portion of said inner hub and electrically connected to said first contact switch;

a second contact switch of magnetic type installed on an outer wall of the outer casing and located adjacent to said first contact switch;
a hollow base plate rigidly fixed under a bottom side of the outer casing;
a blowing fan installed in a hollow section of said hollow base plate;
a supporting disk spacingly fixed on a top of said hollow base plate;
a round plate of ceramic having an aperture in a center portion separately connected to an upper center of said supporting disk;
a second heater disposed within said round plate;




a sensing device provided within the aperature of said round plate in conjunction with a bottom side of the inner pot;
a layer of fabric material of high-temperature resistance disposed between said round plate and said supporting disk;
a power-line disk provided on a bottom side of the base;
a retractable power plug installed within said power-line disk; and
a selective switch having a plurality of function selections electrically connected to said contact switches, said second heater, and said retractable power plug installed on an upper outer side of the base for controlling multiple cooking operations.

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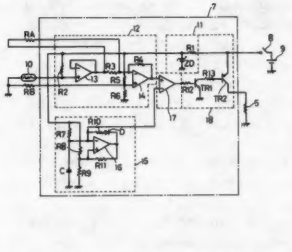
**4,591,699**

## CONTROL CIRCUIT FOR AN ELECTRICALLY HEATED BIMETAL ACTUATED AUTOMATIC CHOKE VALVE

**Yoji Sato, Nagoya, and Keiichi Yamamoto, Okazaki, both of Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Okazaki, Japan**

**Continuation-in-part of Ser. No. 314,786, Oct. 26, 1981, abandoned. This application May 29, 1984, Ser. No. 614,536**
**Claims priority, application Japan, Oct. 31, 1980, 55-156718**
**Int. Cl.[4] H05B *1/02***
**U.S. Cl. 219—497** **5 Claims**




1. A hybrid control circuit for a bimetal actuated automatic choke valve adapted to be operated by a heater comprising a temperature-voltage convertor circuit including first operational amplifier means for generating a first output voltage corresponding to an ambient temperature detected by a thermosensor, and second operational amplifier means for generating a second reference output voltage, said second reference output voltage being effected by two external interchangeable resistances, an oscillator circuit for generating a triangular pulse signal having a fixed period, a comparator for comparatively receiving the respective outputs from said temperature-voltage convertor circuit and said oscillator circuit, and a switching circuit for on-off control of said heater according to the output from said comparator, thus allowing choke valve operation to be tailored to various specific engine designs without necessitating replacement of the complete hybrid control circuit.

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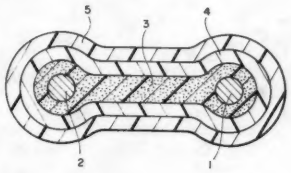
**4,591,700**

## PTC COMPOSITIONS

**Umesh K. Sopory, San Jose, Calif., assignor to Raychem Corporation, Menlo Park, Calif.**

**Continuation of Ser. No. 150,909, May 19, 1980, abandoned. This application Mar. 12, 1984, Ser. No. 589,032**
**Int. Cl.[4] H05B *1/02***
**U.S. Cl. 219—505** **17 Claims**




1. A self-limiting heater suitable for use at line voltages of about 120 volts or more which comprises
(a) a PTC element composed of a PTC conductive polymer composition which exhibits PTC behavior, which has a resistivity at 25° C. of at least $10^2$ ohm.cm and which comprises
(i) 50 to 85%, by weight of the composition, of a polymer component which comprises a mixture of a first crystalline fluorinated polymer having a first melting point, $T_1$, which is from 100° C. to 175° C. and a second crystalline fluorinated polymer having a second melting point, $T_2$, which is at least 200° C., the ratio by weight of said first polymer to said second polymer being from 1:3 to 3:1, and
(ii) a particulate filler component which has been dispersed in said polymer component and which comprises carbon black in amount 8 to 40% by weight of the composition; and
(b) two electrodes which are are in electrical contact with said PTC element and which can be connected to a source of electrical power to cause current to flow through the PTC element;
said heater having a resistance at 25° of $R_{25}$ ohms. and a resistance at 25° C. after being maintained at a temperature of 160° C. for 1000 hours, $R_{1000}$, which is less than $2 \times R_{25}$.

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**4,591,701**

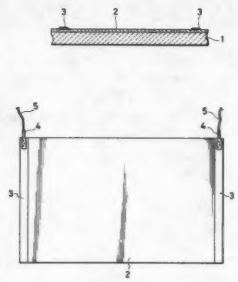
## HEAT RADIATING SHEET BODY

**Sennosuke Tokumaru, 10-3, Tsujido Taiheidai 1-chome, Fujisawa-shi, Kanagawa-ken 251, Japan**

**Filed Dec. 19, 1984, Ser. No. 683,738**
**Claims priority, application Japan, Mar. 15, 1984, 59-48117**
**Int. Cl.[4] H05B *3/16***
**U.S. Cl. 219—543** **17 Claims**

1. A heat radiating sheet body comprising:
(a) a flexible sheet having as a major component thereof ceramic fibers;
(b) a carbon particle layer, adhered to at least one surface of said ceramic fiber containing flexible sheet, said carbon

particle layer having a surface thickness which is essentially even and uniform over the surface of said ceramic fiber containing flexible sheet, and



(c) a pair of electrodes disposed on said carbon particle layer so that there is a space between the electrodes.

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**4,591,702**

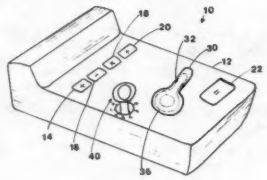
**DIGIT MANIPULATIVE DATA INPUT KEY**

**Naveed Alam, 2604 E. 5th Pl. (#9), Tulsa, Okla. 74104**

**Continuation of Ser. No. 32,353, Apr. 23, 1979, abandoned. This application Apr. 10, 1981, Ser. No. 253,009**

**Int. Cl.[4] G06** *00/00; G07 00/00*

**U.S. Cl. 235—1 R** **6 Claims**



1. In devices requiring input of data by a user to perform desired functions, a data input key comprising;

a lower portion pivotally maintained within said device;

an upper ring portion removably attached to the lower portion and extending exteriors of said device for digital manipulation;

said upper portion comprising a single opening for insertion of a finger or thumb of the user therein;

the data key adapted to be moved in a designated path whereby particularly situated positions in said designated path, when engaged by said input key, providing particular input data to the device.

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**4,591,703**

**ANSWER BAR OF A CALCULATOR**

**Calven Kuo, Taipei, Taiwan, assignor to Aurora Mechatronics Corp., Taipei, Taiwan**

**Filed Apr. 23, 1985, Ser. No. 726,271**

**Int. Cl.[4] G06C** *7/02*

**U.S. Cl. 235—145 R** **1 Claim**

1. A numerical calculator, comprising: a casing having an operating panel, a calculating circuit board disposed in said casing, a plurality of numeral entry and function keys mounted on said calculating circuit board and projecting out of said operating panel of said casing, and an elongated answer bar projecting out of said operating panel and extending substantially across a full width of said panel below the numerical entry and function keys and along a front end of said panel to

facilitate ready depression by a thumb or palm heel of a user's hand.

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**4,591,704**

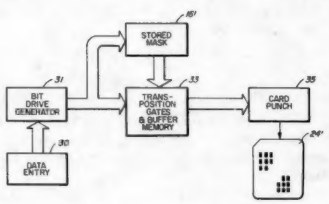
**DATA SCRAMBLING SYSTEM AND METHOD**

**Michael D. Sherwood; William T. Gregor, both of Mesa; Kenneth D. Snyder, Phoenix; Saddah El-Kilani, Tempe, and Richard W. Roth, Scottsdale, all of Ariz., assignors to Engineered Systems, Inc., Tempe, Ariz.**

**Filed Apr. 18, 1983, Ser. No. 486,030**

**Int. Cl.[4] G06K** *5/00*

**U.S. Cl. 235—380** **8 Claims**




1. A system for encoding a credit card or the like for use in a vending machine or the like in a manner to prevent fraudulent fabrication of cards which will work in such vending machine, and in which a predetermined number of identifiable bit locations are used for encoding such data, said system for encoding such credit cards including in combination:

means for entering data to be encoded on a credit card according to a known standard pattern of bit locations for such data;

means for transposing said bit locations of said bits of data into new locations according to a predetermined stored pattern;

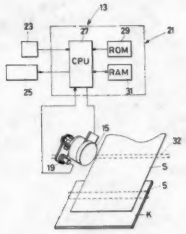
means coupled with said data entering means and said transposing means for scrambling and transposing said bits of data to said new bit locations; and

marking means coupled with the output of said transposing means for entering encoded data on said credit cards in accordance with said predetermined stored pattern of transposed bit locations.

## 4,591,705
## DATA PROCESSING DEVICE FOR INVENTORY CONTROL

Michiharu Toudou, 14-17, Jingumae 3-chome, Shibuya-ku, Tokyo, Japan

Filed Jul. 7, 1983, Ser. No. 511,537
Claims priority, application Japan, Mar. 17, 1983, 58-43222
Int. Cl.[4] G06F *7/08*
U.S. Cl. 235—381 10 Claims




1. A data processing method for loading and unloading in a stock yard with data processing apparatus for reading and writing codes on a card showing information, said method comprising the steps of:

inserting into the apparatus a measuring sheet and a permission card provided with coded information showing the type of a truck at a portal of the yard;

thereafter determining whether the truck is entering or leaving the stock yard by detecting the absence or presence, respectively, of coded information on said measuring sheet;

measuring the weight of the truck by means of a truck scale connected to the apparatus; and

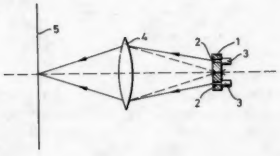
if the truck was determined to be entering the stock yard, printing on the measuring sheet encoded information corresponding to the type of truck in response to the coded information on the permission card, and also printing encoded information the measured weight of the truck, or

if the truck was determined to be leaving the stock yard, printing on the measuring sheet the differential weight between the measured weight and the truck weight corresponding to the information encoded on said measuring sheet.

## 4,591,706
## PHOTODETECTOR

George E. Sims, 10 Bramble Close, Harpenden, Hertfordshire, Al5 4AN, England

Filed Jul. 30, 1984, Ser. No. 635,454
Claims priority, application United Kingdom, Aug. 8, 1983, 8321294
Int. Cl.[4] G06K *7/10*
U.S. Cl. 235—454 14 Claims

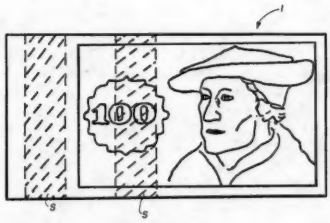



1. A photodetector made from semiconductor material, said material being in the form of an apertured body or substrate to enable a light source to be mounted on one side thereof for illuminating the other side via the aperture or apertures.

## 4,591,707
## PRINTED SECURITY WITH HALLMARKS

Gerhard Stenzel, Munich, and Wittich Kaule, Gauting, both of Fed. Rep. of Germany, assignors to Gao Gessellschaft fur Automation und Organisation mbH, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 348,552, Feb. 12, 1982, abandoned, which is a continuation-in-part of Ser. No. 82,255, Oct. 5, 1979, Pat. No. 4,289,978. This application Aug. 23, 1984, Ser. No. 644,641
Claims priority, application Fed. Rep. of Germany, Oct. 18, 1978, 2845401
Int. Cl.[4] G06K *19/06*
U.S. Cl. 235—493 33 Claims




1. In a security paper such as a bank note, the combination comprising a single-layer, sheet-like paper substrate; a substantially invisible hallmark in the form of a coating for providing verification of the authenticity of the security paper, said coating being disposed on an outer surface of said security paper in a discontinuous manner whereby coated and uncoated areas are alternately present on such surface; the hallmark coating being formed of a substance having a measurable physical property selected from the group consisting of fluorescence, photoconductivity and UV absorbency; said measurable physical property providing an identifying measurement for such substance; said hallmark coating being applied to said substrate outer surface by a deposition technique such as evaporation or cathode sputtering so as to provide a substance-identifying measurement indicative of said hallmark coating in the pure state free of any measurement-altering adulterant such as binders, overlying films, etc.

## 4,591,708
## HIGH-INTENSITY OPTO-ELECTRONIC SENSOR HAVING LOW POWER CONSUMPTION

Stephen K. Shu, Fountain Valley, Calif., assignor to Del Mar Avionics, Irvine, Calif.

Filed Nov. 17, 1980, Ser. No. 207,627
Int. Cl.[4] G01D *21/04*
U.S. Cl. 250—221 8 Claims

1. A photoelectric sensor of low power consumption comprising:

a clock generating a pulse output;

photoemitter means;

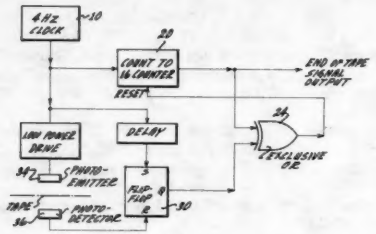
means responsive to said clock signal for pulsing said photoemitter means;

counter means for counting said clock output and deriving a sensor output signal upon reaching a predetermined count;

means for normally re-setting said counter means prior to reaching said predetermined count; and

photodetector means for deriving a pulse output responsive

to said photoemitter pulses, said photodetector output being connected for disabling said means for re-seting to




enable said counter means to reach said predetermined count to thereby derive said sensor output signal.

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**4,591,709**

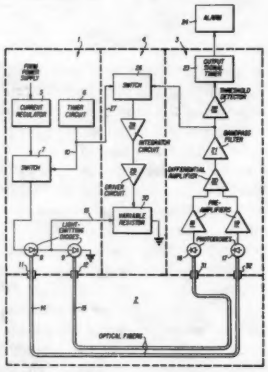
## OPTICAL FIBER SECURITY SYSTEM

**Walter Koechner, 1054 Harriman St., Great Falls, Va. 22066, and Rudolf G. Buser, R.D. 1, Box 153, Wall, N.J. 07719**

**Filed Dec. 19, 1983, Ser. No. 562,734**

**Int. Cl.[4] G08B *13/18***

**U.S. Cl. 250—221** **8 Claims**




1. A security system comprising:

a first independently cladded optical fiber strand having a first light source connected to one end thereof and a first light intensity detection means connected to the other end thereof;

a second independently cladded optical fiber strand having second light source connected to one end thereof and a second light intensity detection means connected to the other end thereof;

said first fiber strand being spaced apart and completely unconnected to said second fiber strand,

means responsive to a predetermined light intensity loss caused by deformation of either of said first or second fiber strand at any point along the length of said first or second fiber strand when there is no change in the light intensity of the other of said first or second fiber strand to actuate intrusion detection means wherein the light intensity reaching said first light intensity detection means is substantially equal to the light intensity reaching the said second light intensity detection means before a deformation is caused in either the first or second fiber strand and wherein the light intensity detection means are unequal when a deformation occurs in one of said first or second fiber strand.

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**4,591,710**

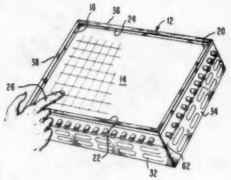
## AMBIENT LIGHT AND ELECTROMAGNETIC NOISE REDUCTION CIRCUIT

**Bruce M. Komadina, Champaign; Vladeta D. Lazarevich, Bondville, both of Ill., and August H. Beining, Fullerton, Calif., assignors to Electro Mechanical Systems, Inc., Champaign, Ill. and Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jul. 11, 1983, Ser. No. 512,821**

**Int. Cl.[4] G01V *9/04***

**U.S. Cl. 250—221** **19 Claims**




1. An interference reduction circuit comprising:

means for providing at least one pair of light emitting devices and photodetectors each disposed along a light beam path extending therebetween;

a photodetector output circuit;

switching means for successively coupling the output of said at least one photodetector to said photodetector output circuit;

an electromagnetic noise compensation pickup circuit extending generally coextensively with and electrically balanced with said photodetector output circuit; and

circuit means including combining means for differentially combining the outputs from said photodetector output circuit and said electromagnetic noise compensation pickup circuit to substantially eliminate the electromagnetic noise component present on the output signal of said photodetector output circuit.

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**4,591,711**

## TRANSMITTING AND RECEIVING DEVICE FOR OPTOELECTRONIC COMMUNICATION SYSTEMS, AND METHOD OF MAKING THE DEVICE

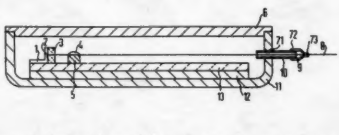
**Franz Taumberger, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Nov. 14, 1983, Ser. No. 551,460**

**Claims priority, application Fed. Rep. of Germany, Dec. 3, 1982, 3244867**

**Int. Cl.[4] G02B *6/42***

**U.S. Cl. 250—227** **10 Claims**




1. In a transmitting and receiving device for optoelectronic transmission systems having electronic circuits housed in a metal case and an opening on the outside wall of the metal casing for insertion of a metalized glass optical fiber, the improvement comprising metal tubing inserted in the outside wall of said metal case to provide an hermetically sealed lead-in for said glass optical fiber, wherein a metal ferrule-type connecting piece is soldered to an end of said metal tubing at a larger

inside diameter end of the connecting piece and to said metalized glass fiber passing through said connecting piece at its smaller inside diameter end having a small solder gap to form an hermetic seal, and said tubing is metalized in the area of said connecting piece.

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**4,591,712**

## PHOTOELECTRIC FIBER OPTIC SENSING APPARATUS WITH ILLUMINATED ACTUATOR

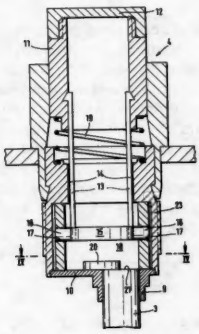
**René A. Thalmann, Starrkirch-Wil, Switzerland, assignor to Elektro-Apparatebau Olten AG, Olten, Switzerland**

**Filed Mar. 9, 1983, Ser. No. 473,733**

**Claims priority, application Switzerland, Mar. 29, 1982, 1908/82**

**Int. Cl.⁴ H01J *5/16***

**U.S. Cl. 250—227** **11 Claims**



1. Sensing apparatus, comprising an elongated fiber optics conductor having first and second end faces; a single light source arranged to direct light into the first end face of the conductor so that the light issues from the second end face; an actuator including a housing, said conductor having an end portion including said second end face and installed in said housing, said actuator further including optomechanical modulating means provided in said housing for effecting the reflection of varying amounts of light issuing from the second end face back into the conductor wherein the reflected light propagates itself back to the first end face and said actuator also including means for moving the modulating means between a plurality of positions in one of which positions the modulating means effects the reflection of a first amount of light and in another of which positions the modulating means effects the reflection of a second amount of light smaller than the first amount into the second end face of the conductor, said housing having a light-transmitting portion located in the path of propagation of light which issues from the second end face of the conductor and is not reflected by said modulating means so that the quantity of light impinging upon said portion of the housing increases when the quantity of reflected light decreases and vice versa; light-sensitive transducer means disposed in the path of reflected light issuing from the first end face of the conductor and arranged to transmit a signal whose characteristics are a function of the amount of reflected light; and means for receiving signals from the transducer means.

**4,591,713**

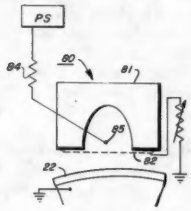
## EFFICIENT, SELF-LIMITING CORONA DEVICE FOR POSITIVE OR NEGATIVE CHARGING

**Robert W. Gundlach, Victor, and Richard F. Bergen, Ontario, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Jan. 3, 1984, Ser. No. 567,717**

**Int. Cl.⁴ H01T *19/04***

**U.S. Cl. 250—326** **6 Claims**




1. A compact self-limiting and highly efficient scorotron device adapted to apply a uniform charge to a photoconductive surface, comprising:

a non-conductive shield;

a coronode wire positioned within said shield and adapted to give off corona emissions when energized;

a low voltage power source adapted to supply energy to said coronode wire;

a screen placed between said coronode wire and said photoconductive surface, said screen being sufficiently close to said photoconductive surface that fringing fields between said screen and said photoconductive surface contribute to efficient ion pumping as well as potential leveling on said photoconductive surface; and

and impedance means connected to said wire to prevent arcing.

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**4,591,714**

## LIGHT GUIDE MEMBER FOR RADIATION IMAGE READ-OUT

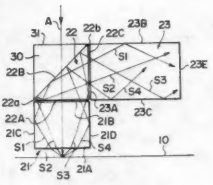
**Chiaki Goto; Kazuo Horikawa, and Masaru Noguchi, all of Kanagawa, Japan, assignors to Fuji Photo Co., Ltd., Minami-ashigara, Japan**

**Filed Mar. 13, 1985, Ser. No. 711,167**

**Claims priority, application Japan, Mar. 15, 1984, 59-50025**

**Int. Cl.⁴ G02B *6/00***

**U.S. Cl. 250—327.2** **8 Claims**




1. A light guide member for radiation image readout, which comprises:

(i) a first optical block provided with a light input face positioned close to and approximately in parallel with a stimulable phosphor sheet carrying a radiation image stored therein to stand face to face therewith, a light output face approximately parallel with said light input face, and four side faces constituting front, rear, right and left total reflection planes between said light input face and said light output face,

(ii) a second optical block provided with a light input face standing face to face with said light output face of said

first optical block via a small space, a dichroic optical plane extending upward obliquely from one end of said light input face of said second optical block at an angle of approximately 45° with respect to said light input face, said dichroic optical plane transmitting stimulating rays and reflecting light emitted by said stimulable phosphor sheet upon exposure to the stimulating rays, a light output face extending downward from an upper end of said dichroic optical plane to said light input face of said second optical block, and two side faces constituting right and left total reflection planes among said light input face, said dichroic optical plane and said light output face, and

(iii) a third optical block provided with a light input face standing face to face with said light output face of said second optical block via a small space, an upper total reflection plane extending approximately horizontally from an upper end of said light input face of said third optical block, a lower total reflection plane extending approximately horizontally from a lower end of said light input face, two side faces constituting right and left total reflection planes between said upper total reflection plane and said lower total reflection plane, and a light output face opposite to said light input face.

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**4,591,715**

## LIGHT GUIDE MEMBER FOR RADIATION IMAGE READ-OUT

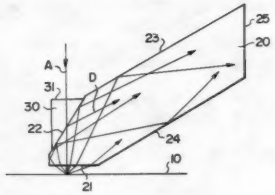
**Chiaki Goto, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Mar. 13, 1985, Ser. No. 711,093**

**Claims priority, application Japan, Mar. 15, 1984, 59-50024**

**Int. Cl.⁴ G02B *6/00***

**U.S. Cl. 250—327.2** **9 Claims**




1. A light guide member for radiation image readout, which comprises an optical block provided with:

(i) a light input face positioned close to and approximately in parallel with a stimulable phosphor sheet carrying a radiation image stored therein to stand face to face with said stimulable phosphor sheet,

(ii) a dichroic optical plane formed above said light input face at an angle larger that 45° with respect to said light input face, said dichroic optical plane transmitting stimulating rays and reflecting light emitted by said stimulable phosphor sheet upon exposure to said stimulating rays,

(iii) an upper total reflection plane extending upward obliquely from an upper end of said dichroic optical plane approximately in parallel with the path of light reflected by said dichroic optical plane after entering from said light input face approximately normal thereto, and

(iv) a lower total reflection plane extending upward obliquely and approximately in parallel with said upper total reflection plane from an end of said light input face farther from said dichroic optical plane.

**4,591,716**

## RADIOACTIVE CONCENTRATION MEASURING APPARATUS

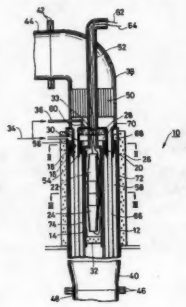
**Hiroshi Kitaguchi, Naka, and Masaaki Fujii, Katsuta, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 9, 1984, Ser. No. 629,044**

**Claims priority, application Japan, Jul. 8, 1983, 58-123316**

**Int. Cl.⁴ G01J *1/00***

**U.S. Cl. 250—336.1** **8 Claims**




1. A radioactive concentration measuring apparatus comprising a vertically-disposed outer cylinder, an inner cylinder disposed in said outer cylinder, a radioactive concentration measuring means disposed in said inner cylinder, a radioactive liquid feed means for supplying a radioactive material-containing liquid in the form of a substantially annular current into an annular clearance between said outer and inner cylinders, a first cleaning liquid feed means for supplying cleaning liquid along the inner surface of said outer cylinder, and a second cleaning liquid feed means for supplying cleaning liquid along the outer surface of said inner cylinder.

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**4,591,717**

## INFRARED DETECTION

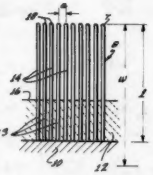
**Werner Scherber, Bermatingen, Fed. Rep. of Germany, assignor to Dornier System GmbH, Friedrichshafen, Fed. Rep. of Germany**

**Filed Apr. 27, 1984, Ser. No. 604,861**

**Claims priority, application Fed. Rep. of Germany, May 3, 1983, 3316027**

**Int. Cl.⁴ G01J *1/00***

**U.S. Cl. 250—338** **19 Claims**




1. Infrared detector including a vacuum tube containing an infrared sensitive layer comprising:

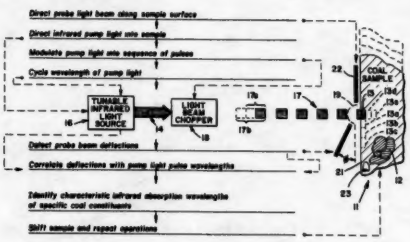
a plurality of densely packaged, metallic, electrically conductive needles; and

a substrate for supporting said needles so that said needles extend perpendicularly to the substrate, the diameter and the distance of the needles being smaller by about one order of magnitude or more than the wave length of the radiation to be detected.

## 4,591,718
## PHOTOTHERMAL METHOD FOR IN SITU MICROANALYSIS OF THE CHEMICAL COMPOSITION OF COAL SAMPLES

**Nabil M. Amer, Berkeley, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Oct. 25, 1983, Ser. No. 545,338**
**Int. Cl.[4] G01J *5/08;* G01N *21/63***
**U.S. Cl. 250—339** **10 Claims**


Direct probe light beam along sample surface
Direct infrared pump light into sample
Modulate pump light into sequence of pulses
Cycle wavelength of pump light
TUNABLE INFRARED LIGHT SOURCE
LIGHT BEAM CHOPPER
COAL SAMPLE
Detect probe beam deflections
Correlate deflections with pump light pulse wavelengths
Identify characteristic infrared absorption wavelengths of specific coal constituents
Shift sample and repeat operations

1. In a method of identifying chemical constituents of a localized region of a coal sample, the steps comprising:

directing at least one sequence of infrared light pulses into said sample region from a location spaced apart from a surface of said coal sample,

varying the wavelength composition of successive ones of said infrared light pulses of said sequence,

detecting thermally induced index of refraction changes in the medium which is between said location and said surface of said coal sample that accompany optical absorption of said infrared pulses in said sample region, said index of refraction changes being detected by directing a probe beam of light along said surface of said coal sample and through the portion of said medium that is adjacent said sample region, and by detecting the amount of deflection of said probe beam at said portion of said medium that is caused by each of said infrared light pulses of said sequences thereof,

correlating said index of refraction changes with the particular infrared light pulse wavelengths that initiate the changes, and

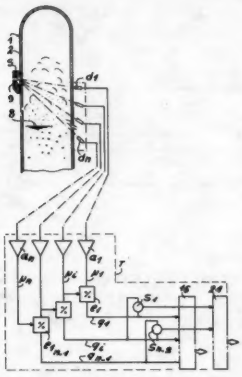
identifying said chemical constituents by correlating said particular wavelengths with the characteristic peak infrared absorption wavelengths of specific coal constituents.

## 4,591,719
## APPARATUS FOR MEASURING THE LEVEL OF A LIQUID IN AN ENCLOSURE

**Alain Bonnemay, Orsay, France, assignor to Commissariat a l'Energie Atomique, France**

**Filed Jun. 17, 1983, Ser. No. 505,199**
**Claims priority, application France, Jun. 24, 1982, 82 11078**
**Int. Cl.[4] G01T *23/10;* G01F *23/00***
**U.S. Cl. 250—357.1** **10 Claims**

1. An apparatus for measuring the level of a liquid in an enclosure comprising a radiation source positioned in the vicinity of the enclosure wall, a number n of radiation detectors, where n is equal to or greater than three, said radiation source being positioned above said detectors, said radiation detectors supplying signals and said radiation detectors being separated from said radiation source by paths traversing the enclosure and being located at different levels on the same vertical line, each detector $d_i$ supplying, after amplification, a signal $u_i$ which is proportional to the radiation intensity received, processor means for processing said signals supplied by said detectors, said processor means comprising $n-1$ dividing circuits, means for connecting detectors $d_i$ and $d_{i+1}$ in pairs to a dividing circuit which acts as quotient means for producing the quotient $u_i/u_{i+1}$, and indicator means for indicating the level

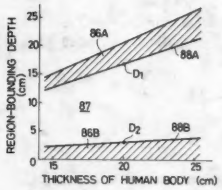


at the gap between those detectors $d_i$ and $d_{i+1}$ for which the quotient $u_i/u_{i+1}$ is the maximum.

## 4,591,720
## METHOD OF MEASURING RADIOACTIVITY

**Masaaki Fuji, Katsuta; Yuichi Izumi, Sendai, and Hiroshi Kitaguchi, Naka, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 28, 1983, Ser. No. 555,613**
**Claims priority, application Japan, Nov. 27, 1982, 57-207967**
**Int. Cl.[4] G01T *1/20***
**U.S. Cl. 250—362** **20 Claims**




1. A method of measuring radioactivity, comprising the steps of:

measuring the radioactivity of a subject to obtain a γ-ray energy spectrum of radioactivity signals;

determining a photoelectric effect component and a Compton-scattered component of said γ-ray energy spectrum; and

performing a discrimination between surface and internal contamination of said subject on the basis of the ratio between said photoelectric effect component and said compton scattered component of said γ-ray energy spectrum.

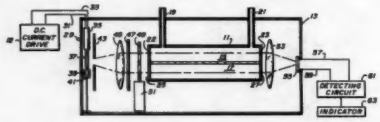
## 4,591,721
## OXYGEN ANALYSIS EMPLOYING ABSORPTION SPECTROSCOPY

**Jacob Y. Wong, Santa Barbara, Calif., assignor to Andors Analyzers Incorporated, Berkeley, Calif.**

**Filed Oct. 10, 1984, Ser. No. 659,253**
**Int. Cl.[4] G01J *1/42***
**U.S. Cl. 250—373** **9 Claims**

1. A method for detecting the presence and amount of elemental oxygen in a sample cell, comprising, passing through

the sample cell extreme ultraviolet light from a low pressure arc lamp emitting a wavelength band FWHM of less than about 0.50 angstrom unit, said band overlapping at least one of the Schumann-Runge absorption lines of oxygen at a substantial intensity, detecting the intensity of the ultraviolet light




passing through the sample cell, comparing the detected intensity of the ultraviolet light with the intensity of a predetermined non-absorbed condition of said ultraviolet light, and producting a signal proportional to the difference in detected intensities to thereby represent oxygen concentration.

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**4,591,722**

## LOW TEMPERATURE STAGE FOR MICROANALYSIS

**William H. Biddlecombe, Ralston; Hugh Y. Elder, and W. A. Patrick Nicholson, both of Glasgow, all of United Kingdom, assignors to The University Court of the University of Glasgow, Scotland**

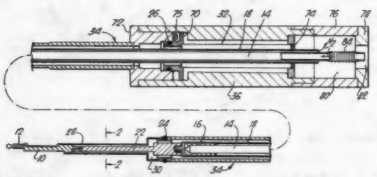
**PCT No. PCT/GB83/00115, § 371 Date Dec. 19, 1983, § 102(e) Date Dec. 19, 1983, PCT Pub. No. WO83/03707, PCT Pub. Date Oct. 27, 1983**

**PCT Filed Apr. 19, 1983, Ser. No. 568,207**

**Claims priority, application United Kingdom, Apr. 20, 1982, 8211341**

**Int. Cl.[4] H01J *37/20***

**U.S. Cl. 250—443.1** **7 Claims**



1. A low-temperature stage for use in an electron microscope, comprising a main body, a holder adapted to hold a specimen mount stationary with respect to the main body, a heat exchanger within the main body, conduit means for supplying coolant to the heat exchanger, a bar of relatively large cross-section and relatively high thermal conductivity interconnecting the heat exchanger and the specimen mount holder to form a heat transfer path therebetween, a support member of relatively small cross-section and relatively low thermal conductivity interconnecting the main body and the specimen mount holder, the support member being a hollow member disposed around said bar, and sealing means disposed on the exterior of the main body for cooperation with an electron microscope to permit rotation and translation of the stage within the microscope, the sealing means being adjacent the support member whereby the latter acts also as a thermal isolator between the sealing means and the cryogenic parts.

**4,591,723**

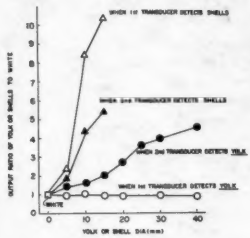
## OPTICAL EGG INSPECTING APPARATUS

**Hirokazu Akiyama, Zushi, Japan, assignor to Q. P. Corporation, Tokyo, Japan**

**Filed Feb. 27, 1985, Ser. No. 706,366**

**Int. Cl.[4] G01N *21/64***

**U.S. Cl. 250—461.1** **7 Claims**




1. An egg inspecting apparatus for detecting yolk included in egg white, which comprises:

(a) means (**10**) for projecting a polarized beam onto the egg white to be inspected;

(b) means (**41**) for analyzing light reflected from the egg white to obtain an analyzed beam, polarization axes of said polarized beam projecting means being perpendicular to that of said light analyzing means;

(c) means (**44**) for splitting the analyzed beam into a first split beam and a second split beam;

(d) first means (**45A**) for transducing the first split beam into a first electric signal corresponding thereto, a first sensitivity range of said first transducing means lying within an absorption spectrum range of yolk;

(e) second means (**45B**) for transducing the second split beam into a second electric signal corresponding thereto, a second sensitivity range of said second transducing means lying within a range excluding the first sensitivity range;

(f) first means (**51A**) for comparing the first electric signal generated from said first transducing means with a first reference level and generating a first comparison signal indicative of presence of shells when the first electric signal exceeds the first reference level;

(g) second means (**51B**) for comparing the second electric signal generated from said second transducing means with a second reference level and generating a second comparison signal indicative of presence of shells or yolk when the second electric signal exceeds the second reference level; and

(h) means (**53**) for determining presence of yolk when said first comparing means generates no first comparison signal but said second comparing means generates the second comparison signal.

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**4,591,724**

## CURING APPARATUS

**Yoshiro Fuse; Takao Naganuma; Akiyoshi Fujimori, all of Chofu; Kozo Arai, Chuo; Katsutoshi Igarashi, Chuo, and Yuzi Naito, Chuo, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd. and ORC Manufacturing Co., Ltd., both of Tokyo, Japan**

**Filed Mar. 5, 1985, Ser. No. 708,578**

**Claims priority, application Japan, Mar. 7, 1984, 59-43185**

**Int. Cl.[4] G21K *5/02***

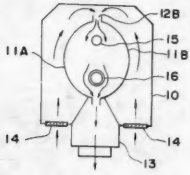
**U.S. Cl. 250—492.1** **9 Claims**

1. A curing apparatus utilizing ultraviolet radiation for curing a coating over the surface of a line-shaped medium, comprising:

a pair of reflecting mirrors, each having an elliptical mirror surface, and the ratio between the major and minor axes of

said elliptical mirror surfaces of said pair of reflecting mirrors being within a range from 1.02 to 1.35 , and said elliptical mirror surfaces are symmetrical with respect to a plane including first and second focal axes of said reflecting mirrors;

a source for producing ultraviolet radiation, said source




having a tube disposed along a first focal axis of said pair of reflecting mirrors for emitting ultraviolet radiation; and

a hollow tube which is disposed along a second focal axis of said pair of reflecting mirrors and through which said line shaped medium is passed in the axial direction of said hollow tube said hollow tube allowing the transmission of ultraviolet ray.

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**4,591,725**

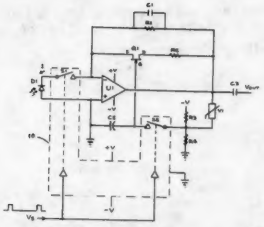
## SYSTEM FOR AMPLIFYING ALL FREQUENCIES DETECTED FROM A FLAME DETECTOR

**Jack A. Bryant, 500 Main St., Melrose, Mass. 02176**

**Filed Oct. 26, 1983, Ser. No. 545,440**

**Int. Cl.⁴ G08B *17/12***

**U.S. Cl. 250—554** **6 Claims**



1. A flame monitoring circuit comprising:

(a) a detector for providing a direct current electrical signal, which varies in proportion to the intensity of the light striking the detector;

(b) an amplifier for amplifying the signal of said detector;

(c) a negative feedback network for controlling the gain of said amplifier in response to the highest peak value of the signal of said detector over a substantial period adapted to allow the amplification of all frequencies down to D.C., including flicker frequency, equally; and,

(d) means for transmitting all frequencies detected by said detector downstream for further processing.

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**4,591,726**

## OPTICAL FAULT SEEKING APPARATUS FOR WEBS

**Christoph Schenk, Icking, Fed. Rep. of Germany, assignor to Erwin Sick GmbH Optik-Elektronik, Waldkirch, Fed. Rep. of Germany, 03071986**

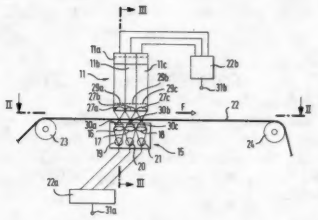
**Filed May 24, 1984, Ser. No. 613,829**

**Claims priority, application Fed. Rep. of Germany, Sep. 22, 1983, 3334357**

**Int. Cl.⁴ G01N *21/88***

**U.S. Cl. 250—572** **4 Claims**

1. An optical fault seeking apparatus for webs moving in their longitudinal direction at a certain speed, the apparatus comprising: an optical scanning arrangement for generating on the surface of the web a plurality of light beads and generating a corresponding plurality of light traces on the surface of the web so that the light traces extend transverse to the direction of movement of the web parallel to each other, with a spacing such that on passage of the web past all the light traces each point is detected only once by a scanning light bead, and a



photoelectric light receiving arrangement receiving light reflected from and/or passing throught the web in the area of the light beads, and for transmitting corresponding electrical signals, the light receiving arrangement having a respective photoelectric receiver for each light trace, the light traces being formed by light of different wavelengths, and the photoelectric receivers being matched to the wavelengths of the associated light traces.

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**4,591,727**

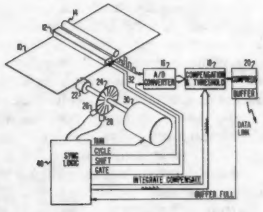
## SOLID STATE SCANNER FOR A VARIABLE SPEED TRANSPORT

**Georg Gaebelein, deceased, late of Charlotte, N.C. (by Gertrud S. Gaebelein, executor); Richard B. Bhend; Robert D. Keillor, both of Rochester, Minn.; Jeffrey L. Lovgren, Rochester, Minn., and John R. Mercer, Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 14, 1983, Ser. No. 551,234**

**Int. Cl.⁴ H04N *3/14***

**U.S. Cl. 250—578** **2 Claims**




1. Scanning apparatus for delivering electronic images of successive regions of an image source, the scanning apparatus including a solid state time integrating photo-detector array and means for cycling said array to produce electronic conversions of optical images, and displacement means for relatively moving said array and said image source to optically present successive regions of said image source to said array, wherein the improvement comprises:

means responsive to continually varying displacement of said image source relative to said array for producing an enabling pulse each time the image source has moved a predetermined amount with respect to said array;

means for producing clock pulses to cycle said linear array;

logic means responsive to said enabling pulses and to said clock pulses for gating out picture elements sensed by said array upon the occurrence of a predetermined relation

between one of said enable pulses and one of said clock pulses;

means responsive to said enabling pulses to vary the frequency of said clock pulses to be substantially equal to the frequency of said enabling pulses when the enabling pulses occur within a predetermined range of frequencies; and

amplitude compensation means responsive to said means for varying the frequency of said clock pulses for multiplying the output signals from said array be a correction factor related to the frequency of said clock pulses.

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**4,591,728**

## TRANSFORMERLESS POWER UNIT

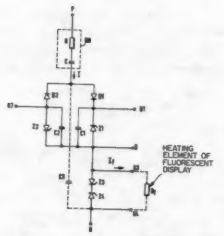
**Tilmann Krüger, Neunkirchen; Werner Arnold, and Leonhard Scheumann, both of Nuremberg, all of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Fed. Rep. of Germany**

**Filed Mar. 8, 1984, Ser. No. 587,377**

**Claims priority, application Fed. Rep. of Germany, Mar. 17, 1983, 3309529**

**Int. Cl.[4] H02M** *7/02*

**U.S. Cl. 307—75** **3 Claims**




1. In a transformerless power circuit having two direct current voltage outputs and an alternating current voltage output for heating a filament of a fluorescent display of an electronic appliance; said circuit comprising:

compensating resistance network connected to one pole of a supply voltage, said compensating resistance network including a series circuit of a resistor and a capacitor;

two oppositely poled rectifier diodes each connected to the output of the compensating resistance network utilizing both half-waves of the supply voltage, each of said diodes respectively generating one independent direct-current output voltage with a common null point;

a capacitor and a zener diode forming a voltage stabilizer connected in parallel with respectively each of the two direct-current voltage outputs between the rectifier diodes and the common null point;

two oppositely poled, series-connected zener diodes connected between the common null point and a second pole of the supply voltage; and

an alternating-current voltage output formed by two output terminals branched off between the common null point and the second pole of the supply voltage in parallel with the series connected zener diodes, the zener voltage being equal or lower than the maximum allowable voltage for heating the filament of the fluorescent display.

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**4,591,729**

## CONTROL UNIT FOR SWITCHING ON A TEACHING DEVICE

**Hansjurgen Jansen, and Karl-Heinz Gelsen, both of Pinneberg, Fed. Rep. of Germany, assignors to Sita Bauelemente GmbH, Pinneberg, Fed. Rep. of Germany**

**Filed Jun. 26, 1984, Ser. No. 624,588**

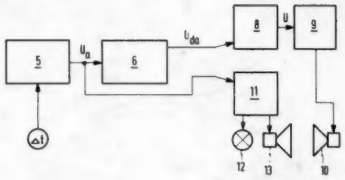
**Int. Cl.[4] H01H** *35/00*

**U.S. Cl. 307—116** **3 Claims**

1. A control unit to switch on a teaching device which conveys optical and/or acoustical information when the alpha-state of a test subject is reached as determined by the pulse, skin resistance, blood pressure or respiration of the test subject, said control unit comprising:

a transducer which converts the pulse, skin resistance, blood pressure or respiration of the test subject as to intensity and rhythm into an electrical analog signal;

a detector connected to said signal to deliver an electrical digital signal when the alpha-state is reached;




a switching unit connected to said detector to switch on the teaching device when the digital signal is applied; and

a signal generator to which the analog signal of said transducer is fed, said signal generator feeding an output signal according to the analog signal to a lamp and a loudspeaker for biofeedback effect.

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**4,591,730**

## MASTER CLOCK GENERATOR FOR TELECOMMUNICATIONS SYSTEM

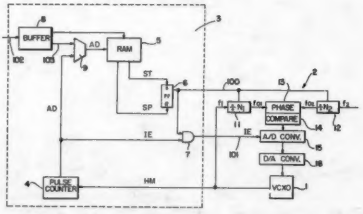
**Giovanni Pennoni, Oegstgeest, Netherlands, assignor to Agence Spatiale Europeenne, Paris, France**

**Filed Jul. 22, 1983, Ser. No. 677,551**

**Claims priority, application France, Aug. 6, 1982, 82 13780**

**Int. Cl.[4] H04J** *3/06;* **H03D** *3/24*

**U.S. Cl. 370—104** **1 Claim**




1. An onboard master clock generator for time-division multiple-access telecommunications system, comprising a voltage controlled oscillator, a phase-locked loop having a first input connected to accept the signals produced by said oscillator and a second input connected to accept a consecutive burst clock signal received from an earth station, said phase locked loop including means responding to an enable signal for detecting the phase difference between the oscillator signals and the burst clock signals, and said phase-locked loop producing a control signal for said oscillator, programmable control logic means to indicate the start and the end of each burst frame period and to produce said enable signal for controlling the phase-locked loop during each frame period, said phase-locked loop including phase comparator means connected to compare the oscillator signals and the burst signals and to produce a signal representing the phase difference between the input signals thereto, and an analog-to-digital converter controlled by sampling signals to sample the phase difference signals and to produce control signals, and a digital-to-analog converter to convert each control signal into an analog signal for controlling said oscillator.

**4,591,731**

## CIRCUIT FOR CONTROLLING THE STOPPING OF EQUIPMENT

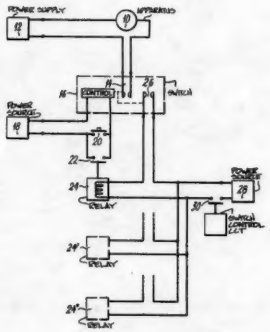
**José Garcia, 101, rue du Chêne Brûlé-Cercottes, 45400-Fleury-les-Aubrais, France**

**Filed Jul. 11, 1983, Ser. No. 508,117**

**Claims priority, application France, Jul. 12, 1982, 82 12185**

**Int. Cl.[4] H01H** *47/00*

**U.S. Cl. 307—132 R** **9 Claims**




1. A circuit for controlling the stopping of equipments, each individual equipment being connected to a power supply and being provided with a switch having at least one contact, said switch being associated with at least one pushbutton able to bring about the alternate switching of said contact into an open position and a closed position, wherein said circuit comprises a supplementary member for controlling the switch, said member being functionally equivalent to the pushbutton, said member being controlled by a relay in series with one of the contacts of the switch, said relay being responsive to remote control means for switching said switch.

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**4,591,732**

## SAFETY RECEPTACLE

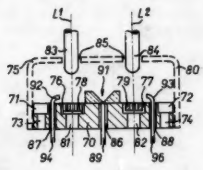
**Ernst Neuenschwander, Männedorf, Switzerland, assignor to Volpi AG, Urdorf, Switzerland**

**Filed Feb. 8, 1985, Ser. No. 699,826**

**Claims priority, application Switzerland, Feb. 10, 1984, 638/84**

**Int. Cl.[4] H01H** *9/54*

**U.S. Cl. 307—140** **14 Claims**




1. A safety receptacle or contact system for use at an outlet end of an electric supply line and for connection of at least one attachment plug having at least two contact pins; said receptacle comprising:

a base plate;

at least two connector ends supported by said base plate, at least one of said connector ends being a live connector end;

a lid or cover housing including:

a front plate having at least two openings for receiving said pins of said plug and for guiding said pins into contact with said connector ends;

an electrical circuit associated with said receptacle for controlled connection of said connector ends with said supply line comprising:

a relay for making and breaking electric contact between said connector ends and said supply line in response to predetermined signals; and

a light barrier means connected with said relay for transmission of said predetermined signals and arranged to cause breaking of said electric contact between said at least one live connector end and said supply line when said pins of said plug are withdrawn from said at least two openings, and to cause making of said electric contact between said at least one live connector end and said supply line only when said pins of said plug are inserted into said at least two openings and approach said at least two connector ends.

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**4,591,733**

## CIRCUIT ARRANGEMENT FOR GENERATING A CONTROL VOLTAGE WHICH IS DEPENDENT UPON AN ALTERNATING VOLTAGE

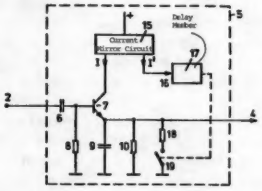
**Ernst Schröder, Hanover, Fed. Rep. of Germany, assignor to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Jan. 14, 1983, Ser. No. 458,045**

**Claims priority, application Fed. Rep. of Germany, Jan. 15, 1982, 3201030; Oct. 22, 1982, 3239138**

**Int. Cl.[4] H03K** *17/56, 5/00, 5/13*

**U.S. Cl. 307—246** **10 Claims**



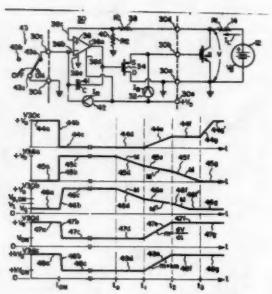

1. A circuit arrangement for generating a control voltage which is dependent upon an alternating voltage, said circuit arrangement comprising: a charging capacitor whose charge state is representative of the control voltage and can be varied by controllable charging and discharging of said capacitor; a charging current source; a charging circuit including a transistor having its base coupled to the alternating voltage, its collector connected to said charging current source and its emitter connected to said capacitor for charging said capacitor under control of the amplitude of the alternating voltage, with the collector voltage of said transistor being representative of the charge state of said capacitor; a capacitor discharge circuit connected in parallel to said capacitor to provide a discharge path for said capacitor, said discharge path having a variable conductance; a delay member connected to said capacitor discharge circuit; and capacitor discharge control means including an evaluation circuit responsive to a signal representative of the collector voltage or current of said transistor connected via said delay member to said capacitor discharge circuit for controlling the conductance of said discharge path in dependence on the time elapsed after a decrease of the alternating voltage amplitude for increasing the conductance of said discharge path in response to a predetermined decrease in the amplitude of the alternating voltage.

4,591,734

## INTEGRATABLE CIRCUIT FOR CONTROLLING TURN-OFF VOLTAGE RATE-OF-CHANGE OF NON-REGENERATIVE VOLTAGE-CONTROLLED SWITCHING SEMICONDUCTOR DEVICES

William J. Laughton, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 27, 1984, Ser. No. 604,359
Int. Cl.[4] H03K *4/94, 3/353, 17/284*
U.S. Cl. 307—248 20 Claims



1. An integratable circuit for controlling the switching between a fully-turned-on condition and a fully-turned-off condition of a non-regenerative power semiconductor device having a control electrode and a controlled-conduction circuit through which a current flows responsive to the magnitude of a signal at the control electrode being between a conduction threshold and a saturation threshold, said circuit comprising:

means for receiving an input signal having first and second characteristics each respectively for directing the switching device to an associated one of said fully-turned-on and fully-turned-off conditions of the current flow therethrough;

means for providing said control electrode signal at a magnitude sufficient to rapidly fully-turn-on said switching device responsive to said first input signal characteristic and for generating said control electrode signal as a ramp signal having a first time-rate-of-change responsive to said input signal second characteristic; and

means providing a feedback signal of magnitude responsive to the time-rate-of-change of the voltage across said controlled-conduction circuit, for causing said control-electrode-signal-providing ramp generating means to reduct the time-rate-of-change of the control electrode signal to a second time-rate-of-change, less than the first time-rate-of-change, responsive to the magnitude of the current flow through said device controlled-conduction circuit when between said conduction and saturation thresholds;

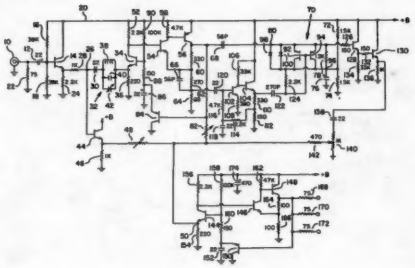
said control-electrode-signal-providing means comprising means responsive to said second input signal characteristic for generating a voltage ramp having a slope controlled by said feedback signals, and comprising: an operational amplifier having a first input receiving said input signal, a second input receiving said feedback signal, and an output coupled to said switching device control electrode; an integrating element coupled between said operational amplifier output and said first input; and means for providing a substantially-constant ramping current to said operational amplifier first input; said control-electrode-signal-providing means also comprising means for buffering said ramp voltage for application to said switching device control electrode.

4,591,735

## VIDEO DETAIL ENHANCING CIRCUIT

James A. Karlock, 3311 NE. 35th Ave., Portland, Oreg. 97212

Division of Ser. No. 516,436, Jul. 25, 1983, which is a continuation of Ser. No. 183,400, Sep. 2, 1980. This application Apr. 20, 1984, Ser. No. 602,557
Int. Cl.[4] H03K *5/08*
U.S. Cl. 307—260 6 Claims



1. A circuit for providing an output at a predetermined voltage level, comprising:

a common base connected input transistor having an input junction at the emitter terminal thereof,

an emitter follower output stage driven from said input transistor and comprising an emitter follower transistor and an output transistor, the collector terminal of the emitter follower transistor being coupled to the base terminal of the output transistor and the emitter terminal of the emitter follower transistor being coupled to the collector terminal of the output transistor,

and a feedback clamping circuit including a clamping capacitor coupled to the common base of said input transistor and a unidirectionally conducting semiconductor device coupled between the capacitor and the collector terminal of the output transistor for changing the charge on said capacitor from the output stage.

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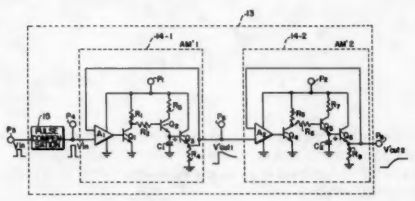
4,591,736

## PULSE SIGNAL AMPLITUDE STORAGE-HOLDING APPARATUS

Yoshiaki Hirao, Kashihara, and Yoshitomi Nagaoka, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 15, 1982, Ser. No. 450,102
Claims priority, application Japan, Dec. 16, 1981, 56-204410
Int. Cl.[4] H03K *5/04, 5/153*
U.S. Cl. 307—267 4 Claims



1. A pulse signal amplitude storage-holding apparatus comprising a plurality of series connected storage-holding means for storing and holding a pulse magnitude of an electrical pulse signal so that a holding time for said pulse magnitude of said electrical pulse signal is successively extended to thereby store said pulse magnitude of said electrical pulse signal in a suffi-

ciently short time in comparison with a pulse width of said electrical pulse signal, wherein each of said plurality of storage-holding means comprises: an operational amplifier having both first and second input terminals and an output terminal, said amplifier being supplied with an input signal at its second input terminal; a capacitor; a charging means for charging said capacitor according to an output signal from said output terminal of said operational amplifier; and a discharging means for discharging said capacitor, an output signal of said discharging means being supplied to said first input terminal of said operational amplifier and also outputted as an output signal of said storage-holding means.

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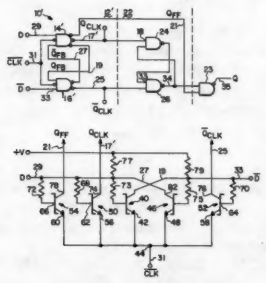
**4,591,737**

## MASTER-SLAVE MULTIVIBRATOR WITH IMPROVED METASTABLE RESPONSE CHARACTERISTIC

**David L. Campbell, Sunnyvale, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Dec. 13, 1982, Ser. No. 449,089**
**Int. Cl.[4] H03K** *3/037, 3/286, 19/003, 19/013*
**U.S. Cl. 307—272 A** **12 Claims**



**1.** A master stage of a logic device for providing logic outputs, as logic input controlling loads, to logic inputs of a slave stage, said master stage being responsive to a clock signal and to complementary first and second master data signals, said master stage comprising:

(a) master latch means for latching a master logic state including first and second master transistors respectively having a control electrode, a common electrode and a controllable logic state electrode, said first and second master transistor control electrodes resistively receiving said first and second master data signals, respectively, said first and second master transistor controllable logic state electrodes being respectively coupled so as to respectively provide said second and first master data signals, and said common electrodes being coupled to commonly receive said clock signal;

(b) first buffer means for generating a first logic output corresponding to said master logic state and for providing said first logic output to a respective first logic input of said slave stage such that said first logic input is independent load isolated from other logic inputs of said slave stage receiving logic outputs from said master stage; and

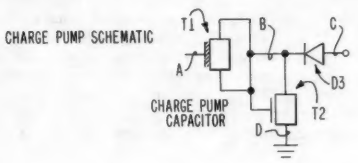
(c) second buffer means for generating a second logic output corresponding to said master logic state and for providing said second logic output to a respective second logic input of said slave stage such that said second logic input is independent load isolated from other logic inputs of said slave stage, said first and second buffer means generating said first and second logic outputs as the true and complement logic states, respectively, of said master logic state.

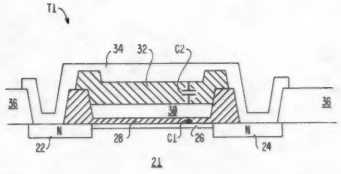
**4,591,738**

## CHARGE PUMPING CIRCUIT

**John S. Bialas, Jr., Manassas; Richard J. Daniels, Dumfries, and William J. Mruk, Chantilly, all of Va., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 27, 1983, Ser. No. 546,224**
**Int. Cl.[4] H01L** *29/78*
**U.S. Cl. 307—296 R** **4 Claims**



**1.** A charge pumping circuit for a substrate voltage generator on a VLSI chip, comprising:

a triple-plate FET capacitor having diffused source and drain regions connected to a first node forming a channel region therebetween, with an implant positioned between said diffused source and drain regions and a first gate electrode juxtaposed over said channel region and connected to a periodic input signal source, and including a second gate electrode juxtaposed over said first gate electrode and electrically connected to said first node, for coupling said periodic signals to said first node;

a PN junction diode having its anode connected to said substrate and its cathode connected to said first node, for providing a charging path from said first node to said substrate;

a current sinking FET device having its drain and gate connected to said first node and its source diffusion connected to ground potential, the source diffusion thereof being shaped as a substantially closed polygon enveloping said triple-plate FET capacitor, said PN junction diode and said current sinking FET device and serving as a guard ring for the circuit;

whereby positive charge is pumped from said substrate through said diode to said first node in response to said periodic input signals coupled through said triple-plate FET capacitor to said said first node, said pumped charge then passing through said current sinking device to ground potential, thereby providing a desired substrate voltage to said substrate.

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**4,591,739**

## IMPEDANCE CONVERSION CIRCUIT

**Katsumi Nagano, Shimonoseki, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan**

**Filed Nov. 25, 1983, Ser. No. 554,907**
**Claims priority, application Japan, Nov. 26, 1982, 57-207166; Dec. 18, 1982, 57-222453; Mar. 31, 1983, 58-53526**
**Int. Cl.[4] H03K** *3/01;* **H03F** *3/04*
**U.S. Cl. 307—297** **15 Claims**

**1.** An impedance converter comprising:

input means to which an input voltage is applied;

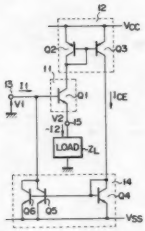
output means at which an output voltage corresponding to said input voltage appears;

load means; and

impedance conversion means provided between said input and output means, said impedance conversion means comprising:

voltage to current converter means for converting said input voltage into an electric current, said voltage to current converter means having an input terminal and an output path, said input terminal being connected to said input means for receiving said input voltage, said output path having first and second terminals, and said first terminal being connected to said load means through said output means;

first current mirror circuit means comprising an input terminal through which an input electric current flows




and an output terminal through which an output electric current flows, said output electric current corresponding to said input electric current, and said input terminal of said first current mirror circuit means being connected to said second terminal of said output path of said voltage to current converter means; and

second current mirror circuit means comprising an input terminal through which an input electric current flows and an output terminal through which an output electric current flows, said last recited output electric current corresponding to said last recited input electric current, and said input terminal of said second current mirror circuit means being connected to said output terminal of said first current mirror circuit means and said output terminal of said second current mirror circuit means being connected to said input means.

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**4,591,740**

## MULTIPLE INPUT PORT CIRCUIT HAVING TEMPERATURE ZERO VOLTAGE OFFSET BIAS MEANS

**Thomas R. Anderson; Howard L. Skolnik, and Bruce C. Trump, all of Tucson, Ariz., assignors to Burr-Brown Corporation, Tucson, Ariz.**

**Filed Feb. 28, 1983, Ser. No. 470,549**

**Int. Cl.[4] H03K** *3/26, 17/56;* **G06G** *7/12*

**U.S. Cl. 307—310** **8 Claims**

1. Apparatus for selectively providing differential output signals to a load circuit comprising:

a plurality of differential input stages receiving input signals, all of said input stages coupled to said load circuit, each of said input stages applying differential output signals to said load circuit when a bias current flows through said amplifier stage and said load circuit;

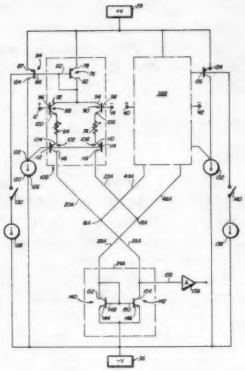
switching means associated with each of said input stages for providing a bias current to said associated input stage when a switching signal is applied thereto, said bias current also flowing through said load circuit;

wherein said input stages comprise:

first and second transistors connected to said load circuit wherein an input signal is a difference between two signals respectively provided to the bases to said transistors;

a first resistor coupled in series with the emitter of said first transistor;

a second resistor coupled in series with the emitter of said second transistor and to said first resistor, said resistors having values that cause the offset voltage of said input stage to be substantially equal to zero; and



transistor means in emitter current paths of said first and said second transistors for providing a flow of emitter currents through said transistors and compensating for the temperature dependence of said emitter currents.

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**4,591,741**

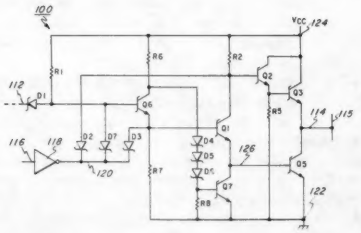
## DRIVE CIRCUIT FOR OUTPUT PULL-DOWN TRANSISTOR

**Michael D. Cooper, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Mar. 5, 1984, Ser. No. 586,535**

**Int. Cl.[4] H03K** *19/013, 19/088*

**U.S. Cl. 307—456** **4 Claims**




1. An integrated circuit comprising:

a first transistor having its collector connected to an output node and its emitter connected to a low voltage source:

a second transistor having its emitter connected to the output node and its collector connected to a high voltage source:

a third transistor having its collector connected to the base of the first transistor and its emitter connected to the low voltage source:

a fourth transistor having its emitter connected to the base of the first transistor for driving the first transistor:

a fifth transistor having its emitter connected to the base of the fourth transistor:

means connected to the base of the second transistor for driving the second transistor in response to the fourth

transistor to turn off the second transistor when the first transistor is on:

means connected between the base of the third transistor and the collector of the fifth transistor for driving the third transistor and for maintaining a voltage level on the base of the third transistor equal to the voltage on the collector of the fifth transistor less a substantially constant voltage; and

means connected to the base and emitter of the fifth transistor and to the base of the second transistor for maintaining both the first and second transistors off in response to a high logic level of a 3-state input signal:

the base of the fifth transistor being responsive, when the 3-state input signal is in a low state, to an input signal of a first logic level to cause the fourth transistor to drive the first transistor on while the third transistor driving means holds the third transistor off, and to an input signal of a second logic level to cause the third transistor driving means to drive the third transistor on to discharge the base of the first transistor to hold the first transistor off.

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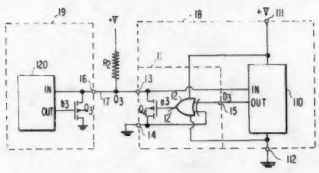
**4,591,742**

## OUTPUT CIRCUIT CAPABLE OF BEING CONNECTED TO ANOTHER CIRCUIT HAVING TRANSISTORS OF ANY CONDUCTION TYPE

**Hiroshi Morito, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed May 9, 1983, Ser. No. 492,916**
**Claims priority, application Japan, May 7, 1982, 57-76180**
**Int. Cl.⁴ H03K** *17/687*
**U.S. Cl. 307—475** **13 Claims**




1. An integrated circuit comprising:

an input/output terminal;

a common terminal;

an internal circuit outputting a logic signal;

an output transistor having a common electrode, a control electrode and an output electrode;

an exclusive OR circuit having its one input terminal connected to the common electrode of said transistor and the other input terminal applied with said logic signal from said internal circuit;

means for connecting the output terminal of said exclusive OR circuit to the control electrode of said transistor;

means for connecting the output electrode of said transistor to said input/output terminal;

means for connecting the common electrode of said transistor to said common terminal; and

means for connecting said input/output terminal to said internal circuit.

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**4,591,743**

## TEMPERATURE COMPENSATED CURRENT SENSING CIRCUIT

**David Kung, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.**

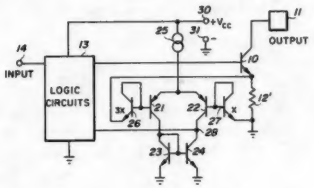
**Filed Dec. 19, 1983, Ser. No. 562,936**
**Int. Cl.⁴ G06G** *7/10, 7/12*
**U.S. Cl. 307—491** **4 Claims**

1. A temperature compensated current sensing integrated circuit amplifier comprising:

a resistor constructed from metallization to have a positive temperature coefficient of resistance and having a predetermined value;

means for passing a current to be sensed through said resistor to produce a voltage drop thereacross;

a differential transistor amplifier constructed to have an offset potential that is established by differential current densities in a pair of transistors; and




means for coupling said resistor to the input of said differential transistor amplifier whereby said voltage drop across said resistor opposes said offset potential so that said offset potential varies as a function of temperature to compensate the temperature coefficient of said resistor.

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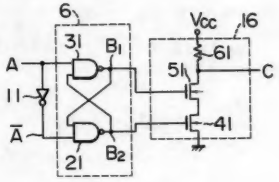
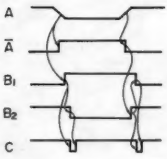
**4,591,744**

## TRANSITION DETECTION CIRCUIT

**Hideharu Koike, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Feb. 7, 1984, Ser. No. 577,763**
**Claims priority, application Japan, Feb. 14, 1983, 58-22510**
**Int. Cl.⁴ G01R** *19/00;* **H03K** *5/153, 19/094, 19/21*
**U.S. Cl. 307—518** **10 Claims**




1. A transition detection circuit comprising:

an inverter circuit for inverting an input signal and outputting an inverted input signal;

an S-R flip-flop circuit having two input terminals and two output terminals, receiving said input signal at one of said input terminals and said inverted input signal at the other of said input terminals, and having a time difference between the transitions of the signals at said two output terminals; and

a coincidence detection circuit receiving the output signals from said output terminals of said flip-flop circuit and generating a coincidence detection signal when said output signals are both at the same and specific logic level;

wherein said coincidence detection signal serves to represent a logic level transition of said input signal.

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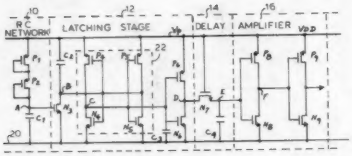
**4,591,745**

## POWER-ON RESET PULSE GENERATOR

**Shannon N. Shen, Trumbull, Conn., assignor to ITT Corporation, New York, N.Y.**

**Filed Jan. 16, 1984, Ser. No. 571,028**
**Int. Cl.[4] H03K** *17/22, 17/20, 17/687, 5/153*
**U.S. Cl. 307—592** **14 Claims**




**1**. A circuit for generating a pulse signal in response to the activation of a power supply; said circuit comprising:

an RC network operatively connected to said power supply and defining a first time constant;

latching means connected to said RC network to initiate a pulse in response to the activation of said power supply and to terminate said pulse in accordance to said first time constant, said RC network and said latching means being formed on a chip by an integrated circuit generating technique; and

delay means, said delay means producing a delayed signal in response to said latching means output voltage level.

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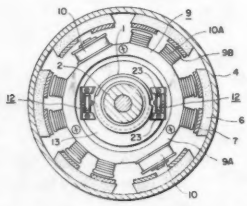
**4,591,746**

## IGNITION SIGNAL GENERATOR FOR INTERNAL COMBUSTION ENGINES

**Takaki Kamiyama, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 3, 1985, Ser. No. 719,294**
**Claims priority, application Japan, Apr. 4, 1984, 59-65775**
**Int. Cl.[4] H02K** *11/00*
**U.S. Cl. 310—70 A** **9 Claims**



**1**. In an ignition signal generator for internal combustion engines comprising:

a main generator consisting of a cup-like fly-wheel **4** which rotates accompanying the turn of an internal combustion engine and which has a plurality of field magnets **6** attached to the inner peripheral surface thereof, and a stator **9** which is so arranged as to oppose to said field magnets **6**; and

a signal generator consisting of a centerpiece **2** which is disposed at the central portion of said fly-wheel **4** and which has had magnets **11** attached to the periphery thereof to excite the pulser, and stators **12** that are provided in an opposing manner on the outside of said pulser-exciting magnets **11** maintaining a gap relative thereto;

wherein said signal generator is comprised of:

a rotor **11** which consists of a cylindrical magnet **15** magnetized in the axial direction, and two disc-like magnetic pole pieces **16, 17** that are attached to both side surfaces of said magnet **15** and that constitute the N pole and the S pole; and

stators **12** which are so disposed that said magnetic pole pieces **16, 17** are sandwiched therebetween, and which have a pulser coil **20** wound on a central portion **21** of a core **19** of which the one end **19B** is opposed to the N pole of said magnetic pole pieces **16, 17** and of which the other end **19C** is opposed to the S pole;

and wherein said disc-like magnetic pole pieces **16, 17** have first stepped portions **16C, 17C** formed between portions **16B, 17B** having a diameter larger than the outer diameter of said cylindrical magnet **15** and portions **16A, 17A** having a diameter smaller than the diameter of said portions **16B, 17B**, said stepped portions **16C, 17C** having such a shape that is coupled by curves **16A, 16B, 17A, 17B** which change gradually along the peripheries of said magnetic pole pieces **16, 17**.

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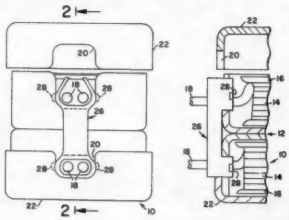
**4,591,747**

## GROMMET UNIT AND MOTOR HAVING SUCH A UNIT

**George B. Soden, Wolcott, and Gerald J. Miller, Prospect, both of Conn., assignors to North American Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 702,436, Feb. 19, 1985, abandoned, which is a continuation of Ser. No. 453,376, Dec. 27, 1982, abandoned. This application Jul. 24, 1985, Ser. No. 758,575**
**Int. Cl.[4] H02K** *5/22;* **H01B** *17/26*
**U.S. Cl. 310—71** **4 Claims**



**1**. A grommet unit for protecting at least two pairs of wires, for use with apparatus having two U-shaped wiring openings, each open outwardly in an opposite axial direction, and two apparatus covers each having a flat-bottomed U-shaped opening, in an installed condition said cover openings being open toward each other and aligned in the axial direction, said unit comprising:

a center section having first and second ends defining an axial direction between said ends, and

first and second wire protecting portions each extending from a respective end,

each wire protecting portion comprising a bottom part and two legs, said legs being spaced from each other in a width direction transverse to said axial direction and each extending outwardly from said bottom portion to a respective tip; and, in a thickness direction transverse to said axial and width directions, each wire protecting portion having a given thickness, and said center section having a thickness less than said given thickness arranged such that each wire protecting portion projects in a same thickness direction with respect to the center section,

at least said legs being made of a flexible material and, in an undeformed condition, the legs of a respective wire protecting portion converging toward each other from the bottom part to the respective tips,

whereby upon placement of each of the wire protecting portions into a respective U-shaped wiring opening of said apparatus, a respective pair of wires for the apparatus can

be passed between the leg tips of each wire protecting portion and placed adjacent the respective bottom part, and upon movement of respective covers into installed conditions opposite each other, the flat-bottomed cover openings will engage the respective leg tips and deform the legs of each wire protecting portion toward each other such that each leg is bent around a respective wire to provide protection against abrasion by the cover.

4. An electric motor comprising:

a central stator portion defining an axial direction, having first and second U-shaped openings aligned axially with the open ends of the openings pointing away from each other,

two stator coils arranged within the stator portion, each having two wires passing radially outward through a respective one of said U-shaped openings,

two covers, each having a flat-bottomed U-shaped opening, said flat-bottomed U-shaped openings being open toward each other and aligned with a respective stator portion opening, and

a grommet unit comprising a center section having first and second ends defining an axial direction between said ends, and first and second wire protecting portions each extending from a respective end,

each wire protecting portion comprising a bottom part and two legs, said legs being spaced from each other in a direction transverse to said axial direction and each extending outwardly from said bottom portion to a respective tip,

at least said legs being made of a flexible material and, in an undeformed condition, the legs of a respective wire protecting portion converging toward each other from the bottom part to the respective tips; said wire protecting portions being seated in respective stator portion openings and said legs being deformed by engagement with respective flat bottoms of said cover openings such that each of said legs is bent around a respective wire and protects it from abrasion against the bottom of the cover opening.

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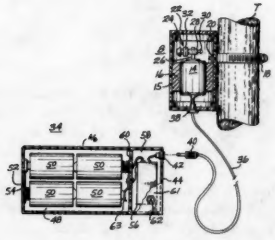
**4,591,748**

## ELECTRONICALLY POWERED APPARATUS FOR IMPARTING VIBRATORY FORCES ON A TREE

**John W. Greer, 5013 Inland Ave., Modesto, Calif. 95351**

**Filed Apr. 11, 1983, Ser. No. 483,885**
**Int. Cl.[4] H02K** *7/06*
**U.S. Cl. 310—81** **2 Claims**



1. An apparatus for imparting vibratory forces on a tree, comprising:

(a) an electric motor having a rotary output shaft;

(b) means for mounting said electric motor on the trunk of the tree;

(c) eccentric weight means secured to said motor output shaft;

(d) battery means for energizing said electric motor;

(e) electric power control circuit means for automatically, intermittently interconnecting said battery means with said electric motor for closely spaced, short-duration time intervals; said power control circuit means includes:

a switch operably disposed between said battery means and said motor; and,

control means for opening and closing said switch at a cyclic rate, said control means including manually operable means for varying said cyclic rate to effect substantially continuous rotation of the output shaft of said electric motor at a selected speed for inducing a desired level of vibration on the tree; and

(f) wherein said eccentric weight means includes an elongate, nominally straight, pliable shaft, said shaft being bendable at a desired location along its length to vary the magnitude of the eccentric weight.

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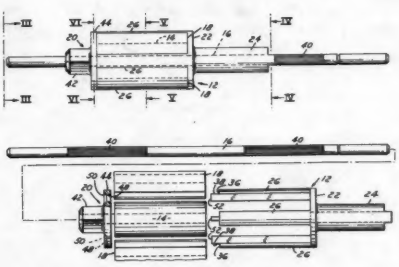
**4,591,749**

## PERMANENT MAGNET ROTOR WITH INTERFIT CAGE STRUCTURE

**Robert E. Gauthier, Willington, Mass., and Mark Susser, Albany, N.Y., assignors to Ex-Cell-O Corporation, Troy, Mich.**

**Filed Mar. 21, 1985, Ser. No. 714,644**
**Int. Cl.[4] H02K** *21/16, 1/06*
**U.S. Cl. 310—156** **2 Claims**



1. A permanent magnet rotor assembly comprising a magnet cage having a washer-like segment with a plurality of equally spaced legs extending from the outer peripheral portions of one face thereof, with each of said legs being shaped such that the opening between adjacent legs at the outer surface thereof is narrower than the opening between the legs at an intermediate height thereof, a sleeve mounted in the center of the plurality of legs against said washer-like segment, a shaft press fitted through said sleeve and said cylindrical extension, a plurality of wedge-shaped magnets mounted around said sleeve, with each magnet confined between adjacent legs are retained thereby against said sleeve within said narrower outer opening, and a cover plate having a plurality of central and radial openings formed therein, said shaft and the end portions of said legs beyond said magnets extending through the respective central and radial openings, the end portions of said legs being deformed in said radial openings to secure the rotor assembly.

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**4,591,750**

## COMPACT RING SHAPED BRUSH MOTOR

**Jeffrey T. Major, Cygnet, and Robert D. Hall, Berkey, both of Ohio, assignors to Allied Corporation, Morris Township, N.J.**

**Filed Dec. 21, 1984, Ser. No. 684,534**
**Int. Cl.[4] H02K** *9/00;* **H01R** *19/00*
**U.S. Cl. 310—237** **9 Claims**

1. A compact ring shaped brush motor comprising:

a frame member;

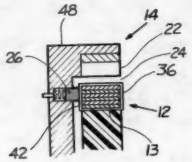
a stator mounted on said frame member;

a ferrous back-up ring located on said stator and supporting a plurality of permanent magnets thereon;

a rotor mounted for rotation in said frame member, said rotor formed of a continuous strip of ferrous material wound in a toroidal shape;

winding means including insulated wire wound around said rotor forming a continuous conductive loop;

commutator means formed on one surface of said winding means; and




at least one pair of brushes equally and angularly spaced around said frame member and in operative contact with said commutator means.

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**4,591,751**

## FIELD COIL ASSEMBLY FOR A DYNAMOELECTRIC MACHINE

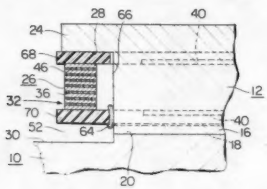
**Shoziro Ono, Isahaya, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 4, 1984, Ser. No. 616,740**

**Claims priority, application Japan, Jun. 8, 1983, 58-103595**

**Int. Cl.⁴ H02K *1/24***

**U.S. Cl. 310—269** **8 Claims**




1. A magnetic field device for a dynamoelectric machine having a rotor comprising:

a magnetic field pole mounted on said rotor of the dynamoelectric machine and having a radially extending rectangular section formed with an annular groove and carrying a mushroom-shaped head portion;

a substantially rectangular magnetic field coil wound on said radially extending rectangular section of said pole and located within said groove, said coil having side portions adjacent side portions of said pole and end portions, including top and bottom faces, axially spaced from end portions of said pole, said pole being bevelled at four radially extending corners between said side portions and said end portions of said pole to provide corner spaces enlarging the axial spaces between the end portions of the coil and the end portions of the pole; and

U-shaped insulation members inserted only between said pole and coil side portions leaving said coil end portions exposed to the surrounding atmosphere including the atmosphere in said spaces.

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**4,591,752**

## INCANDESCENT LAMP WITH HIGH PRESSURE RARE GAS FILLED TUNGSTEN-HALOGEN ELEMENT AND TRANSPARENT THICK WALLED SAFETY ENVELOPE

**Wolfgang E. Thouret, Verona; Rudolph Kaufman, North Bergen, and Harry Kee, Dumont, all of N.J., assignors to Duro-Test Corporation, North Bergen, N.J.**

**Filed Oct. 14, 1983, Ser. No. 541,997**

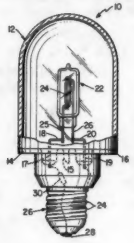
**Int. Cl.⁴ H01K *1/34***

**U.S. Cl. 313—25** **19 Claims**

1. A ruggedized, general service tungsten-halogen lamp unit comprising:

a sealed first envelope of transparent vitreous material having therein an incandescent filament, an amount of a halogen scavenger and a fill gas at a pressure of at least between about 6 and about 12 atmospheres when the lamp unit is inoperative, the material of said first envelope being substantially impervious to the fill gas,

a sealed transparent outer protective envelope of a material and construction which is mechanically strong enough to




withstand explosion of said first envelope surrounding said first envelope,

and a fill gas having a pressure of at least about 600 torr when the lamp unit is inoperative in the space between said first an outer envelopes to reduce the stresses on the inner envelope.

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**4,591,753**

## ELECTRON BEAM APPARATUS COMPRISING A WIRE SOURCE

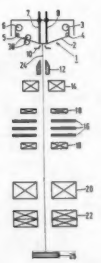
**Franciscus A. Stoelinga, Heemskerk, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jun. 14, 1984, Ser. No. 620,777**

**Claims priority, application Netherlands, Jun. 28, 1983, 8302275**

**Int. Cl.⁴ H01J *1/18***

**U.S. Cl. 313—146** **15 Claims**



1. An electron beam apparatus comprising an electron source including an elongated thermal electron emissive element, said element being heated; and two supports spaced at most 1 mm apart of providing heat dissipation of said element, said element being displaceable under tension in the longitudinal direction between said two supports, wherein said element provides an electron emitting element, and said supports provide thermal equilibrium for said element.

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**4,591,754**

## ELECTRON GUN FOR BRIGHTNESS

**Hirotoshi Hagiwara; Hideo Hiraoka, and Masaji Ishii, all of Tokyo, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 604,420, Apr. 30, 1984, abandoned, and a continuation of Ser. No. 330,458, Dec. 14, 1981. This application Apr. 22, 1985, Ser. No. 724,948**

**Claims priority, application Japan, Dec. 27, 1980, 55-185518**

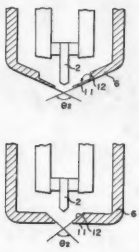
**Int. Cl.⁴ H01J *1/16, 19/10***

**U.S. Cl. 313—336** **8 Claims**

1. An electron gun for high brightness, comprising:

a $LaB_6$ single crystal cathode having a (100) plane on at least

part of a main electron beam emission surface of a cathode tip, and



a Wehnelt having a tapered surface defining an interior vertical angle ($\theta_2$) similar to or more than a vertical angle ($\theta_1$) of said cathode tip.

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**4,591,755**

## CATHODE-RAY TUBE WITH MAGNETIC RING

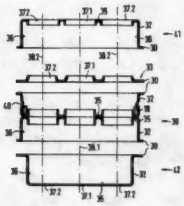
**Walter Kornaker, Berkheim, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.**

**Filed May 21, 1982, Ser. No. 380,792**

**Claims priority, application Fed. Rep. of Germany, Jun. 12, 1981, 3123298**

**Int. Cl.⁴ H01J *29/56, 29/76***

**U.S. Cl. 313—412** **6 Claims**



1. A cathode-ray tube comprising:

a screen panel;

a funnel section;

a neck section;

an electron gun disposed in said neck section;

a magnetic deflection system located at the junction region of said funnel section with said neck section and serving to deflect the electron beams over said screen panel;

said electron gun comprising a single magnetic ring surrounding said beams, said electron gun being so dimensioned that said magnetic ring lies outside the portion of said neck region which is covered by said deflection system, said electron gun further comprising a focusing electrode, said focusing electrode comprising: four cup-shaped electrode parts each having a bottom, a wall, and a rim, first and second ones of said electrode parts being joined together at their bottoms to form a central part, a third one of said electrode parts facing said screen and having its rim joined to the rim of one of said first or second electrode parts, and a fourth one of said electrode parts having its rim joined to the rim of the other of said first or second electrode parts;

said magnetic ring being attached to said focusing electrode and said magnetic ring is disposed inside one of said first or second electrode parts.

**4,591,756**

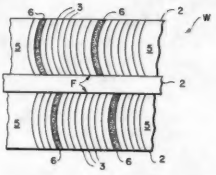
## HIGH POWER WINDOW AND SUPPORT STRUCTURE FOR ELECTRON BEAM PROCESSORS

**Tzvi Avnery, Winchester, Mass., assignor to Energy Sciences, Inc., Woburn, Mass.**

**Filed Feb. 25, 1985, Ser. No. 705,020**

**Int. Cl.⁴ H01J *33/04***

**U.S. Cl. 313—420** **16 Claims**



1. A high power window for an evacuated electron beam generator and the like having, in combination, a longitudinally extending metallic foil window closing off the vacuum, and one or more pluralities of sets of successive parallely and closely spaced arcuately extending conductive fins held by the vacuum pressure to the inner surface of the foil and curving transversely across said inner surface between its longitudinal edges.

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**4,591,757**

## COLOR DISPLAY TUBE HAVING SCREEN WITH SHARPLY CURVED SURFACES

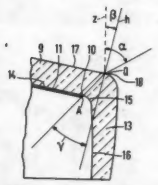
**Gijsbertus Bakker, and Gerhardus J. Rorije, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed May 4, 1984, Ser. No. 607,321**

**Claims priority, application Netherlands, Jun. 12, 1983, 8304178**

**Int. Cl.⁴ H01J *29/10, 61/30;* H04N *5/64***

**U.S. Cl. 313—461** **3 Claims**



1. A color display tube comprising an envelope including a neck, a cone and a faceplate arranged along a longitudinal tube axis, said faceplate comprising a substantially flat display window disposed perpendicular to the axis, a skirt parallel to the axis, and a sharply-curved transition portion connecting the display window to the skirt, said display window having a substantially flat inner surface which meets a sharply-curved inner surface of the transition portion at a peripheral line l and having a substantially flat outer surface which meets a sharply-curved outer surface of the transition portion at a peripheral line m, said tube including a luminescent screen on the inner surface of the display window and an electron beam producing means in the neck for directing an electron beam at said luminescent screen;

characterized in that:

(a) the luminescent screen boundary substantially corresponds with the line l; and

(b) the places where the sharply-curved inner and outer surfaces meet the respective flat inner and outer surfaces are disposed such that the shortest connection line between line l and any point Q on the line m encloses an angle $\gamma$ with a line h perpendicular to the outer surface of the faceplate at the point Q, said angle $\gamma$ fulfilling the requirement:

$$n \sin \gamma = \sin (\alpha - \beta)$$

where n is the refractive index of the faceplate material, $\alpha$ is the minimum desired viewing angle with respect to the tube axis, and $\beta$ is the angle between the line h and a line passing through the points Q parallel to the tube axis.

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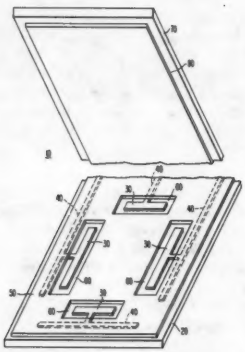
**4,591,758**

## GAS PLASMA DISPLAY PANEL CONTAINING AN IMPROVED LOW-TEMPERATURE DIELECTRIC

**Edward G. Barth, Union; Ruvim Braude, Elizabeth, and Nicholas W. Kay, Mine Hill, all of N.J., assignors to Burroughs Corporation, Detroit, Mich.**

**Division of Ser. No. 506,813, Jun. 22, 1983, Pat. No. 4,547,467.**
**This application Feb. 14, 1985, Ser. No. 701,609**
**Int. Cl.⁴ H01J *17/00*; C03C *3/12***
**U.S. Cl. 313—518** **1 Claim**



1. A gas plasma display panel including
an envelope made up of a base plate and a face plate containing an ionizable gas,
a plurality of thick film cathode electrodes in said envelope,
at least one anode electrode in operative relation with said cathode electrodes, and
a dielectric on said base plate and outlining said cathodes, said dielectric comprising a composition including a lead-free glass frit, silica, and a vehicle,
said glass composition including about 20% by weight of $SiO_2$, about 20% by weight of $B_2O_3$, about 3% by weight of CaO, about 40% by weight of ZnO, about 5% by weight of $Al_2O_3$, about 7% by weight of $Na_2O$, about 4% by weight of $K_2O$, and about 1% by weight of $Li_2O$,
said glass composition being fireable at temperature below about 600° C.

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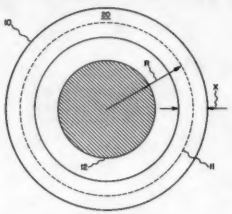
**4,591,759**

## INGREDIENTS FOR SOLENOIDAL METAL HALIDE ARC LAMPS

**Carl L. Chalek, Scotia, and Peter D. Johnson, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Sep. 10, 1984, Ser. No. 649,033**
**Int. Cl.⁴ H01J *61/18***
**U.S. Cl. 313—638** **10 Claims**

1. A solenoidal metal halide arc lamp fill for supporting an arc discharge comprising:
a metal halide comprised of the combination of a metal selected from the group consisting of aluminum, tin, mercury, copper, lead, zinc and antimony with a halogen selected from the group consisting of chlorine and bromine, said metal halide producing substantially continuous white light when in said arc discharge;
sodium chloride for lowering the color temperature and increasing the efficacy of said arc discharge, the amount of said sodium chloride being sufficient to enhance sodium vaporization in said arc discharge by the formation of $NaMCl_x$, where M is said metal and where x is 3 to 5; and



mercury for controlling the arc voltage of said arc discharge.

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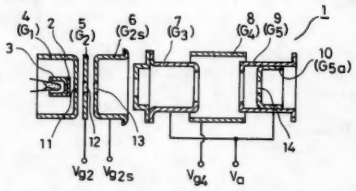
**4,591,760**

## CATHODE RAY TUBE APPARATUS

**Masamichi Kimura, Ibaraki, Japan, assignor to Matsushita Electronics Corporation, Kadoma, Japan**

**Filed Mar. 21, 1984, Ser. No. 592,008**
**Claims priority, application Japan, Mar. 25, 1983, 58-50630; Jul. 20, 1983, 58-133171**
**Int. Cl.⁴ H01J *29/46, 29/56***
**U.S. Cl. 315—16** **20 Claims**




1. A cathode ray tube apparatus comprising:
electron gun means for producing an electron beam along an axis;
a fluorescent screen to be impinged by said electron beam; and
an evacuated enclosure enclosing said electron gun means and said fluorescent screen therein;
said electron gun means comprising:
(a) a pre-triode part having a cathode, a first grid as a control grid, and a second grid on which an accelerating potential is to be applied,
(b) a main lens part,
(c) an additional grid disposed between said pre-triode and said main lens part,
(d) means for impressing a potential on said additional grid which is lower than said accelerating potential of said second grid to focus a substantial part of electrons emitted from said cathode toward said main lens for causing said electrons to cross twice said axis of said electron gun means, and
(e) trimming electrode means disposed in a region of said main lens for trimming a circumferential part of electron beams passing therethrough toward said fluorescent screen.

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**4,591,761**

## RELAXATION OSCILLATOR SYNCHRONIZER FOR PULSED LASER OPERATION

**David P. Gregorich, New Brighton, and Hans W. Mocker, Minneapolis, both of Minn., assignors to Honeywell, Inc., Minneapolis, Minn.**

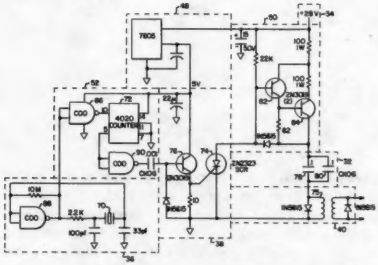
**Filed Jan. 10, 1984, Ser. No. 569,704**
**Int. Cl.⁴ H05B *37/00, 39/00***
**U.S. Cl. 315—170** **19 Claims**

1. An electrical circuit for providing input electrical signals

to a gas filled electrical discharge device, comprising:

first means for storing electrical energy, said first storage means being adapted to provide a first electrical signal upon the application thereto of an electrical energy source, wherein said first electrical signal is not constant and is continuously input to said gas filled device;

second means for storing electrical energy, said second storage means being adapted to provide a second electrical signal upon the application thereto of an electrical energy source;



means for generating a third electrical signal upon the application thereto of an electrical energy source wherein said third electrical signal is not constant; and

means for selectively combining said first and second electrical signals to produce a fourth electrical signal, wherein said means for selectively combining is responsive to said means for generating said third electrical signal and wherein said fourth electrical signal is input to said gas filled device.

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**4,591,762**

## ELECTRONIC FLASH

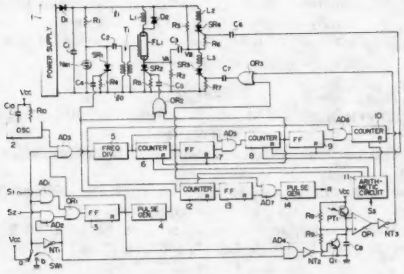
**Hiroaki Nakamura, Hachioji, Japan, assignor to Olympus Optical, Co., Tokyo, Japan**

**Filed May 7, 1984, Ser. No. 607,571**

**Claims priority, application Japan, May 31, 1983, 58-097622; Jun. 7, 1983, 58-102217; Jun. 7, 1983, 58-102218**

**Int. Cl.[4] H05B *37/00***

**U.S. Cl. 315—241 P** **29 Claims**



**1**. A commutation capacitor and a circuit for rapidly charging said commutation capacitor, comprising:

a first switching element connected in series with a flash discharge tube;

the commutation capacitor having one end connected to the junction between the flash discharge tube and the first switching element;

a second switching element connected to the other end of the commutation capacitor to initiate a commutating operation by the capacitor;

a third switching element connected in series with the second switching element across one of a group of elements including a power supply and a main capacitor;

and means for applying a trigger signal to the third switching element when the flash tube and the first switching element are conductive, to to rapidly charge the commutation capacitor.

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**4,591,763**

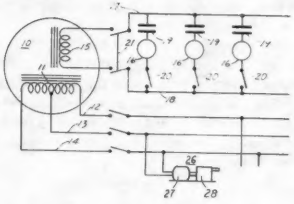
## ELECTRIC GENERATOR SYSTEM FOR PORTABLE FLOODLIGHTING EQUIPMENT

**Michael J. Wanasz, 8107 S. Yukon Way, Littleton, Colo. 80123; Stanley N. Harrison, 6466 E. Ponderosa Dr., Parker, Colo. 80134, and Paul B. McBride, Jr., 1585 Dudley St., No. 5A, Lakewood, Colo. 80215**

**Filed Jul. 14, 1983, Ser. No. 513,295**

**Int. Cl.[4] G05F *1/00*; H05B *37/02, 39/04, 41/36***

**U.S. Cl. 315—304** **4 Claims**



**1**. A power-generating system for portable floodlighting equipment and the like including a gaseous electric discharge lamp and auxiliary electric motor-driven apparatus, an engine-driven generator for supplying alternating current to said lamp and to said auxiliary equipment, said generator having a plurality of windings including a first winding connected to said lamp for supplying current at a voltage sufficiently high for starting said lamp and a second winding connected to said motor-driven apparatus for supplying current at a lower voltage for energizing said auxiliary apparatus, said first winding generating alternating current out of phase with respect to the alternating current generated by said second winding, a capacitor connected in series with said first winding and for limiting the current flowing through said circuit when said lamp is conducting, the phase difference between the current flowing in said first winding and that in said second winding decreasing the likelihood of interference with the operation of the load on either winding upon the occurrence of a change of load on the other.

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**4,591,764**

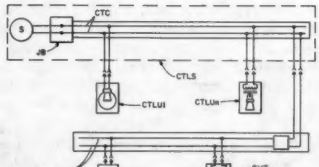
## PLUG-IN AUXILIARY TRACKS FOR TRACK LIGHTING SYSTEMS

**Ole K. Nilssen, Caesar Dr., R.R. 5, Barrington, Ill. 60010**

**Filed Feb. 16, 1984, Ser. No. 580,649**

**Int. Cl.[4] H05B *37/00*; H01R *9/00***

**U.S. Cl. 315—312** **14 Claims**



**12**. A special power track for use with an ordinary track lighting system, said ordinary track lighting system having an ordinary power track adapted for mounting onto a surface, said ordinary power track having a pair of ordinary track conductors and an ordinary receptacle slot operable to receive and hold a number of ordinary track lighting units, said ordi-

nary track conductors being provided with power line voltage from an ordinary electric utility power line, said special power track comprising:

input terminals;

special track conductors comprised within said special power track;

frequency converter connected in circuit between said input terminals and said special track conductors, said frequency converter being operable to provide an AC voltage onto said special track conductors, said AC voltage having a frequency substantially higher than that of said power line voltage;

special receptacle slot operable to receive and hold a number of special track lighting units, said special track lighting units being operable to connect with and to be properly powered from the AC voltage on said special track conductors; and

connect means operable to provide disconnectable connection between said special power track and said ordinary power track, thereby providing for said special power track to be held in substantially rigid mechanical relationship to said ordinary power track as well as for said input terminals to make electrical contact with said ordinary track conductors.

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**4,591,765**

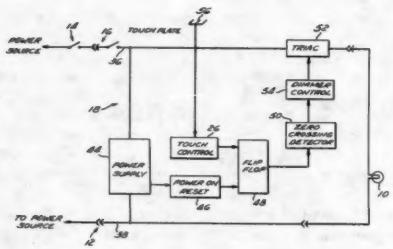
## LAMP CONTROL

**Gregory M. Beck, 24185 Zancon, Mission Viejo, Calif. 92692**

**Filed Oct. 31, 1983, Ser. No. 547,063**

**Int. Cl.[4] H05B** *37/02, 39/04*

**U.S. Cl. 315—361** **7 Claims**




1. A system for controlling application of electrical current to a lamp or the like connected to a conventional wall receptacle controlled by a wall mounted power switch for controlling the application of an electrical power source to said wall receptacle, comprising:

a control module formed to be connected between the wall receptacle and the lamp without modifying the wiring between said wall receptacle and said wall mounted power switch said control module further comprising:

an AC-power supply for connection to the power switch;

a power on-reset circuit connected to the power supply to receive electrical power therefrom for producing a reset signal in response to momentary interruption and immediate subsequent resumption of application of electrical power from the source of electrical power to the power supply;

control switch means responsive to actuation by a user for producing a control signal;

switching means responsive to the reset signal and the control signal for producing a switching signal; and

means responsive to the switching signal for controlling the magnitude of electrical current supplied to the lamp from the source of electrical power so that the lamp may be selectively energized by either the control switch means or the power switch after having been de-energized by either the control switch means or the power switch.

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**4,591,766**

## BRUSHLESS DIRECT CURRENT MOTOR

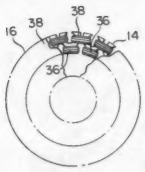
**Yosuke Takaba, Kajiwara, Japan, assignor to Tamagawa Seiki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 24, 1985, Ser. No. 694,460**

**Claims priority, application Japan, Jan. 27, 1984, 59-12019**

**Int. Cl.[4] H02K** *1/12, 29/12*

**U.S. Cl. 318—254** **2 Claims**




1. A brushless d.c. motor having a stator and a rotor;

said stator comprising a stator core with a plurality of magnetic pole pieces disposed circumferencially and separated by slots, stator windings wound around said magnetic pole pieces, a pattern conductor for frequency generation mounted on said stator core, and a drive circuit connectable to a power source for controlling an exciting current to said stator windings in response to a speed control signal from said pattern conductor; and

said rotor comprising a yoke rotatably mounted on said stator, a plurality of permanent magnets mounted on said yoke and having magnetic pole faces in opposition to magnetic pole faces of said magnetic pole pieces of said stator core, and a permanent magnet for frequency generation mounted on said yoke and in opposition to said pattern conductor;

the arrangement being such that said magnetic pieces each have a first portion extending in a radially outward direction, second portions extending from a radially outer end of said first portion in opposite circumferential directions to separate from each other, and third portions extending from tips of said second portions in radially outward direction; and

that said stator windings comprise first windings wound on said first portion and serially connected to each other for each of said magnetic poles, and second windings wound on one of said third portions of said magnetic pole and the adjacent third portion of the contiguous magnetic pole and serially connected to each other, and the phase of said first windings is shifted relative to said second windings.

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**4,591,767**

## CONTROL SYSTEM FOR RECIPROCATING DRIVE MOTOR

**Hiroshi Koide, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 346,889, Feb. 8, 1982, abandoned. This application Apr. 29, 1985, Ser. No. 728,373**

**Claims priority, application Japan, Feb. 12, 1981, 56-19537; May 20, 1981, 56-74816; Jul. 17, 1981, 56-110667**

**Int. Cl.[4] H02P** *5/00*

**U.S. Cl. 318—314** **6 Claims**

1. A control system for a reciprocating drive motor comprising:

loop filter means;

motor drive circuit means for drivingly energizing the motor in accordance with an output signal of the loop filter means;

selection circuit means for selecting one of a start mode and a constant velocity control mode;

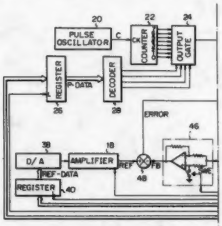
reference pulse generator means for generating reference pulses whose period corresponds to a specified velocity;

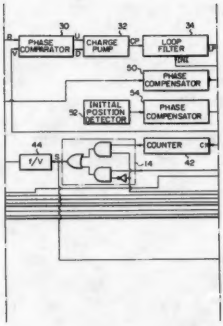
rotary encoder means for generating pulses synchronous with the rotation of the motor;

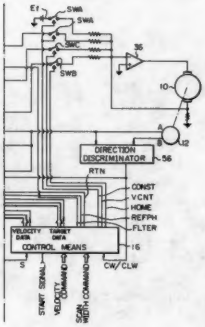
phase comparator means for comparing the reference pusles with the synchronous pulses in phase to produce an output representing the resultant phase difference;

charge pump circuit means connected between the phase comparator means and the loop filter means to produce an output voltage in accordance with the phase difference and to produce a zero output voltage when the phase difference is zero; and

switching means responsive to the selection circuit means for controlling the loop filter means to produce a zero




output voltage in the start mode and to produce an output voltage which varies in accordance with the output voltage of the charge pump circuit means in the velocity control mode;

the charge pump circuit means producing a zero output voltage when the phase difference is zero;

the motor drive circuit means comprising compensating voltage supply means for supplying the motor with a current large enough to overcome frictional forces of a system driven by the motor during the start mode and the velocity control mode, said predetermined output voltage of the loop filter means being zero;

the control system further comprising analog feedback motor speed control means controlled by the selection circuit means to be connected to the motor drive circuit means, the control system further comprising means for disconnecting the output of the loop filter from the analog motor speed control means in the start mode and connecting the output of the loop filter to the motor drive circuit means in the velocity control mode.

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**4,591,768**

## CONTROL SYSTEM FOR AN ELECTRIC MOTOR

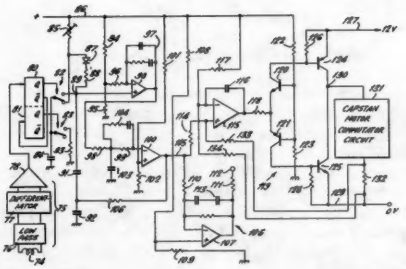
**Stefan Kudelski, Le Mont-sur-Lausanne, Switzerland, assignor to Ampex Corporation, Redwood City, Calif. and Kudelski S.A., Lausanne, Switzerland**

**Filed Sep. 15, 1983, Ser. No. 533,850**

**Claims priority, application United Kingdom, Sep. 17, 1982, 8226574**

**Int. Cl.[4] H02P *5/16***

**U.S. Cl. 318—327** **10 Claims**




1. A control system fo an electric motor, in which system the speed of the motor is monitored to provide a repetitive signal which represents the said speed at discrete times, amplifier means for comparing the repetitive signal with a reference to provide an error signa and for amplifying said error signal, and a power amplifier coupled to drive the motor and coupled to be fed from said amplifier means, said power amplifier providing an output which is controlled in accordance with the speed signal and which determines the energisation of the motor and represents the torque output thereof, characterised in that the aforementioned torque output is integrated and combined with the speed signal in order to provide prediction of the speed signal in the intervals between the discrete times.

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**4,591,769**

## ARRANGEMENT FOR CONTROLLING THE SPEED OF A DC MOTOR

**Howard L. Beckerman, 151 Ivy Hill Rd., Red Bank, N.J. 07701**

**Filed Nov. 29, 1984, Ser. No. 676,097**

**Int. Cl.[4] H02P *5/175***

**U.S. Cl. 318—331** **20 Claims**

1. An arrangement for controlling a DC motor from a source of AC power, comprising:

means for connecting a first side of said motor to a first side of said AC power source;

phase controlled power applying means connected between the second side of said motor and the second side of said AC power source for selectively applying power to said motor;

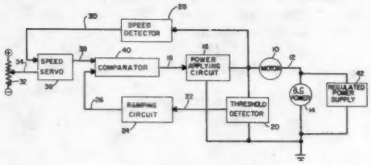
threshold voltage detecting means connected to said second

side of said motor for providing a threshold signal when the magnitude of the voltage at the second side of said motor exceeds a predetermined threshold;

ramping means responsive to said threshold signal for providing a first ramped voltage signal for the duration of said threshold signal during positive half cycles of said AC power and a second ramped voltage signal for the duration of said threshold signal during negative half cycles of said AC power;

speed detector means coupled to said motor for providing a speed signal having a magnitude indicative of the speed of said motor and a polarity indicative of the direction of rotation of said motor;

input means for providing an input signal having a magnitude indicative of a desired speed for said motor and a




polarity indicative of a desired direction of rotation for said motor;

servo means coupled to receive said speed signal and said input signal for providing a servo signal corresponding in magnitude and polarity to the difference between said speed signal and said input signal; and

comparator means coupled to receive said servo signal and said first and second ramped voltage signals for controlling said power applying means to apply the appropriate polarity and phase of said AC power to said motor, said comparator means including a first comparator coupled to receive said first ramped voltage signal and said servo signal, a second comparator coupled to receive said second ramped voltage signal and said servo signal, and means for combining the outputs of said first and second comparators.

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**4,591,770**

## NUMERICAL CONTROLLER

**Shinichi Isobe, and Kazuo Sawada, both of Hino, Japan, assignors to Fanuc Ltd., Tokyo, Japan**

**PCT No. PCT/JP83/00434, § 371 Date Aug. 15, 1984, § 102(e) Date Aug. 15, 1984, PCT Pub. No. WO84/02593, PCT Pub. Date Jul. 5, 1984**

**PCT Filed Dec. 13, 1983, Ser. No. 642,665**

**Claims priority, application Japan, Dec. 20, 1982, 57-223372**

**Int. Cl.⁴ G05B *23/02***

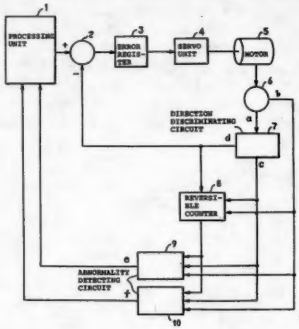
**U.S. Cl. 318—565** **2 Claims**

1. A numerical controller for moving a moving part, comprising:

position sensing means for providing a position sensing pulse each time a moving part moves by a fixed amount, and for providing a reference position sensing pulse each time the moving part reaches a predetermined position;

counter means for counting the position sensing pulse; and

abnormality detecting means for detecting an abnormalty in the position sensing pulse on the basis of the count value of




the counter and the timing of generation of the reference position sensing pulse.

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**4,591,771**

## NUMERICAL CONTROL SYSTEM

**Ryoichiro Nozawa, Tokyo; Tsuyoshi Nagamine; Hideaki Kawamura, both of Hachioji, and Kentaro Fujibayashi, Musashino, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan**

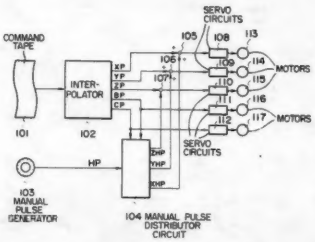
**PCT No. PCT/JP81/00295, § 371 Date Jun. 18, 1982, § 102(e) Date Jun. 18, 1982, PCT Pub. No. WO82/01602, PCT Pub. Date May 13, 1982**

**PCT Filed Oct. 23, 1982, Ser. No. 395,030**

**Claims priority, application Japan, Oct. 23, 1980, 55-148758**

**Int. Cl.⁴ G05B *19/19***

**U.S. Cl. 318—569** **5 Claims**




1. A numerical control system having a tool with a tool axis and a table movable with respect to each other wherein the tool or the table is rotated in at least one of a vertical and horizontal direction so as to align the tool axis direction relative to a workpiece mounted on the table, and is moved in the orthogonal directions of X-, Y-, and Z-axes so as to subject the workpiece to desired machining, said numerical control system including:

means for receiving a commanded amount of movement of said tool or of said table and for providing a command signal varying in accordance with said commanded amount of movement;

manual command generating means for generating a manual command signal in response to a manual input;

distribution means for receiving said command signal and said manual command signal for moving said tool or said table and for maintaining the tool axis direction of said tool relative to said workpiece on the basis of the position of said tool or of said table, as said tool or said table is manually moved in accordance with said manual com-

mand signal with respect to said workpiece under simultaneous control of at least two of the X-, Y- and Z-axes.

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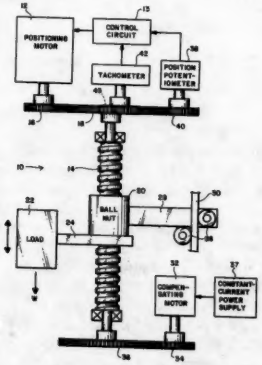
**4,591,772**

## LOAD POSITIONING SYSTEM WITH GRAVITY COMPENSATION

**Richard H. Hollow, Sunnyvale, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Dec. 12, 1984, Ser. No. 681,041**
**Int. Cl.[4] G05D *23/275***
**U.S. Cl. 318—632** **6 Claims**




1. A load positioning system for moving a load in a first direction and a second direction in the vertical plane subjected to the force of gravity comprising first motor means for moving said load in the first and second directions, means for mechanically coupling said first motor means to said load, said force of gravity on said load inducing a torque on said coupling means, and a second motor means coupled to said coupling means for applying a torque equal and opposite to said gravity induced torque, said second motor means compensating for said force of gravity, so that acceleration and velocity of said load produced by said first motor means is symmetrical in the first and second directions.

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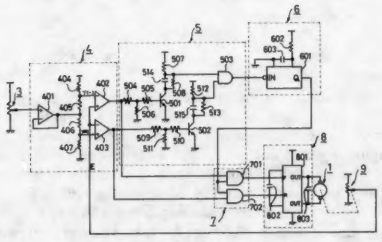
**4,591,773**

## MOTOR DRIVING CIRCUIT FOR MOTOR ACTUATOR

**Hidetaka Numata, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed Dec. 31, 1984, Ser. No. 687,641**
**Claims priority, application Japan, Dec. 29, 1983, 58-200235[U]**
**Int. Cl.[4] G05B *1/06***
**U.S. Cl. 318—663** **3 Claims**



1. A motor driving circuit apparatus for use in a motor actuator of the type having a control means for inputting a driving control signal for the motor, a sensor adapted to output a signal corresponding to the position of the actuator, and a comparator section adapted to compare the input through said control means and the output from said senor and to produce an output signal for driving said motor, said motor driving circuit apparatus comprising:

a differentiation circuit for differentiating the output of said comparator section, and a timer section adapted to be actuated by an output from said differentiation circuit so as to provide an output signal for a predetermined maximum period of time for driving of said motor, wherein the driving control of said motor by the output signal of said comparator section is conducted only within the predetermined maximum period of time in accordance with the ouput signal from said timer section.

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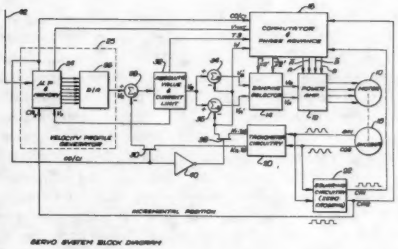
**4,591,774**

## HIGH PERFORMANCE INCREMENTAL MOTION SYSTEM USING A CLOSED LOOP STEPPING MOTOR

**Timothy A. Ferris, Simi Valley; Stephen M. Fortescue, Northridge, and Gaston Palombo, Agoura, all of Calif., assignors to Dataproducts Corporation, Woodland Hills, Calif.**

**Continuation of Ser. No. 265,858, May 21, 1981, abandoned.**
**This application Nov. 14, 1984, Ser. No. 671,032**
**Int. Cl.[4] H02P *8/00***
**U.S. Cl. 318—696** **14 Claims**




SERVO SYSTEM BLOCK DIAGRAM

1. An incremental motion motor control system, comprising:

a stepping motor having a plurality of phases and a plurality of discrete null positions;

position means for determining the angular position of the stepping motor;

velocity means for determining the angular velocity of the stepping motor;

commutator means for commutating the phases of the stepping motor as a function of the output of the position means during a velocity mode of operation, wherein the commutator means operates to commutate the phases of the motor to achieve maximum torque, and wherein the commutator includes (a) first phase advance means for modifying the energization of the phases of the stepping motor during the velocity mode so as to provide maximum accelerating and decelerating torque and (b) second phase advance means for further modifying the energization of the motor as a function of the velocity of the motor to thereby obtain maximum torque despite variations in velocity and despite the electrical time constant of the motor; and

drive means for driving the stepping motor during the velocity mode of operation in accordance with the difference between a desired velocity and the actual velocity of the motor as determined by the velocity means.

## 4,591,775
## ELECTRIC SYNCHRONOUS MACHINE WHICH IS EXCITED VIA ROTATING RECTIFIERS

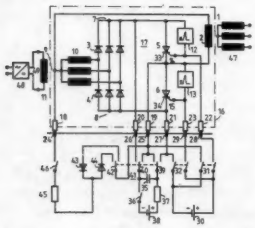
**Lothar Nüssel, and Alfred Radmer, both of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Feb. 12, 1985, Ser. No. 700,979**

**Claims priority, application Fed. Rep. of Germany, Feb. 17, 1984, 3406274**

**Int. Cl.[4] H02P *5/40, 7/40***

**U.S. Cl. 318—711** **2 Claims**



1. An exciter arrangement for an electric synchronous machine, the synchronous machine having an exciter winding excited via rotating rectifier means from a rotating, Y-connected three-phase winding of an exciter machine, t[h]ree outputs of the three-phase winding being coupled to the rectifier means, the rectifier means being Y-connected and having a Y-point, the Y-point being coupled to one end of the exciter winding, the other end of the exciter winding being coupled to a central point of the three-phase winding of the exciter machine, auxiliary slip ring means being provided on a rotating shaft of the exciter machine, said auxiliary slip ring means being coupled to said central point of the three-phase winding and being coupled to stationary electrical means by liftable brush means contacting said slip ring means and further including switch means coupled to said brush means, said rectifier means comprising first and second rectifier means for conducting current from said three-phase winding having different current conduction directions, each rectifier means having a Y-point, and further comprising first and second thyristor means coupled between respective Y-points of said first and second rectifier means and one end of said exciter winding, the control electrodes of each of said thyristor means being coupled to voltage sensitive firing means, the auxiliary slip ring means comprising first auxiliary slip ring means coupled to one end of the exciter winding, second auxiliary slip ring means coupled to the other end of the exciter winding, third and fourth auxiliary slip ring means respectively coupled to the Y-points of the first and second rectifier means, fifth and sixth auxiliary slip ring means coupled to the respective control electrodes of the first and second thyristor means,

the stationary electrical means comprising d-c voltage source means selectively coupled between the control electrode and the cathode of respective ones of the thyristor means so as to fire the respective thyristor means, capacitor means selectively coupled in parallel across the cathode and anode of each thyristor means, and de-energizing means selectively coupled in parallel with the exciter winding by selected ones of anti-parallel connected diode means.

## 4,591,776
## SYNCHRONOUS MACHINE WITH A SUPERCONDUCTING VOLTAGE AND SPEED REGULATOR

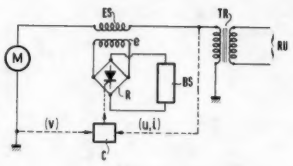
**Jean-Louis Sabrié , Cravanche, France, assignor to Alsthom-Atlantique and Electricite de France, both of Paris, France**

**Filed Sep. 6, 1984, Ser. No. 647,575**

**Claims priority, application France, Sep. 6, 1983, 83 14213**

**Int. Cl.[4] H02P *5/40***

**U.S. Cl. 318—717** **2 Claims**




1. In a synchronous electric machine having a voltage and speed regulator, said machine comprising a stator provided with a secondary winding and a rotor provided with a primary winding, intended for connection to a feeder grid (operating as a motor) or a user grid (operating as an alternator), the improvement wherein the stator winding (ES) is coupled with a second stator winding (e), a static rectifier circuit (R) is connected on its input side to said second stator winding (e), said static rectifier is connected on its output side to a superconducting energy storage winding (BS), and a computer (C) is connected to the rectifier circuit such that rectifier is controlled by said computer (C) programmed to inject active and reactive power into the stator in such a manner as to attenuate transient conditions.

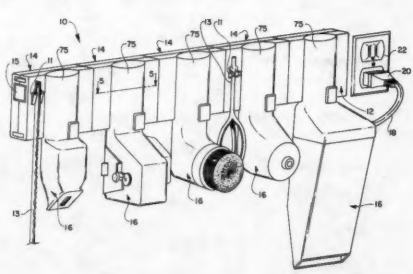
## 4,591,777
## MULTI-STATION MODULAR CHARGING SYSTEM FOR CORDLESS TOOLS AND APPLIANCES

**George W. McCarty, Lutherville, and Somers H. Smith, III, Columbia, both of Md., assignors to Solid State Chargers Research & Development, Lutherville, Md.**

**Filed Dec. 17, 1984, Ser. No. 682,195**

**Int. Cl.[4] H02J *7/00*; H01M *10/46***

**U.S. Cl. 320—2** **34 Claims**



1. A multi-station modular charging system for charging a plurality of units, each of which has at least one rechargeable battery therein and at least one electric contact means therein for conducting d.c. current to the at least one rechargeable battery, the charger comprising an electrically conductive series circuit having a plurality of normally closed pairs of contacts in electrical series with each other, a power source, a charging means receiving current from said power source and being connected to said electrically conductive series circuit, a plurality of substantially identical modules for completing said

electrically conductive series circuit, each of said modules having therein at least one pair of said plurality of normally closed pairs of contacts, each of the units having a respective said at least one electrical contact means connected to the respective at least one rechargeable battery therein, and each of said modules having a releasable connection means for incorporating the respective electrical contact means of respective said units into said electrically conductive series circuit via respective pairs of said normally closed pairs of contacts by effecting opening thereof; whereby rechargeable batteries within the units may be placed in series with said electrically conductive series circuit and each other to be charged by the d.c. current flowing in the series circuit.

**34**. In a charging system, the combination of a unit including a generally cylindrical housing having a battery pack therein, a charger means having a face plate provided with a generally semi-cylindrical scalloped recess complementary to the housing for the battery pack, a protuberance in the recess of the charging means, the protuberance having an opening therein, electrical contact means within the charger means and including a pair of contact elements resiliently biased into a normally closed position, the unit having a recess formed therein complementary to the protuberance, wherein the unit substantially envelops the protuberance, and a contact-carrying extension member within the unit and extending through the opening in the protuberance, the extension number carrying respective contact strips in engagement with the contact elements in the charger means.

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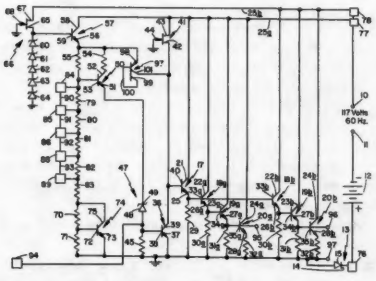
**4,591,778**

## CURRENT PULSE PRODUCING CIRCUIT

**Varnum S. Holland, Amherst, N.H., assignor to Solid State Chargers Research & Development, Lutherville, Md.**

**Filed Aug. 22, 1984, Ser. No. 643,299**
**Int. Cl.[4] H02J** *7/04*
**U.S. Cl. 320—39** **41 Claims**



**1**. In a direct current pulse producing circuit including means for connection to at least one energy storing component of a D.C. power supply, means for connection to an electrical power source, an electrical charging circuit coupling said input means to said means for connection to at least one energy storing component of a D.C. power supply for supplying D.C. charging current pulses thereto and rectifying means for producing unfiltered rectified D.C. voltage, an improvement wherein said charging circuit comprises controlling circuit means and charging current carrying means coupled to receive output from said rectifying means, said charging current carrying means being coupled to said controlling circuit means and responsive to its output, said controlling circuit means being free of feedback from said charging current carrying means and being solely responsive to the instantaneous level of the unfiltered rectified D.C. voltage and voltage across the storing component for controlling said charging current carrying means to allow conduction thereof only during periods when the instantaneous level of the unfiltered D.C. voltage is substantially between a first level greater than the voltage across the storing component and a second higher level which exceeds the first level by substantially a given amount and to prevent conduction during periods when the instantaneous level of the unfiltered D.C. voltage exceeds the second level, and wherein said controlling circuit means includes a variable resistive network operatively arranged to set the voltage level at which the charging current carrying means are turned off.

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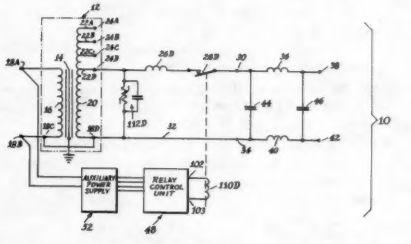
**4,591,779**

## REGULATED A.C. POWER SUPPLY

**Roy B. Carpenter, Jr., Whittier, and Mark Drabkin, La Mirada, both of Calif., assignors to LEA Dynatech Inc., Santa Fe Springs, Calif.**

**Filed Aug. 20, 1984, Ser. No. 642,631**
**Int. Cl.[4] G05F** *5/04*
**U.S. Cl. 323—301** **2 Claims**




**1**. A regulated a.c. power supply for delivering power at a regulated a.c. output through switching of secondary transformer winding taps in a manner so as to impede switching transients and momentary short circuit currents occurring during the switching process without the loss of any portion of the a.c. sine wave and without incident ill-effects of switching having an auxiliary power supply connected with an unregulated a.c. supply phase and providing regulated power of at least one discrete voltage and polarity, means for filtering noise, RFI and related undesirable and prohibitive equipment manifestations ahead of the output terminals of the subject voltage regulator and means for the protection against hazards incoming with the a.c. power line transients,

comprising in combination:

a transformer having a primary winding connected with the a.c. supply line and a secondary winding equipped with at least two taps,

at least one relay having a coil and at least one single-pole, single-throw, normally-open load contact,

a said relay load contact connected across each of said at least two adjacent secondary transformer winding taps,

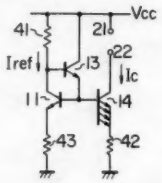
a relay control unit receiving regulated power of at least one discrete voltage and polarity,

said relay control unit having means for sensing and monitoring the a.c. supply line voltage for the corresponding energizing of a said relay coil and actuating a said relay load contact individually and in a sequence with another said relay load contact, selectively.

## 4,591,780
## CONSTANT CURRENT SOURCE DEVICE HAVING A RATIO METRICITY BETWEEN SUPPLY VOLTAGE AND OUTPUT CURRENT

**Kazuji Yamada, Hitachi; Ryoichi Kobayashi, Ibaraki; Yasuo Nagai, Maebashi; Isao Shimizu, Gunma, and Kanji Kawakami, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 8, 1983, Ser. No. 559,467**
**Claims priority, application Japan, Dec. 10, 1982, 57-217597**
**Int. Cl.[4] G05F 3/20**
**U.S. Cl. 323—313** **9 Claims**




1. A current source device to be connected to a first DC power supply, which may provide a fluctuating DC voltage, for supplying a predetermined amount of current to a load irrespective of the magnitude of the load comprising:

a first terminal to be connected to a first polarity output of said power supply;

a second terminal to be connected to a second polarity output of said power supply;

a first transistor having a collector and a base which are electrically connected together;

first resistor means having one end connected to said first terminal and the other end connected to the collector of said first transistor;

second resistor means having one end connected to an emitter of said first transistor and the other end connected to said second terminal;

a second transistor having a base connected to the base of said first transistor;

third resistor means having one end connected to an emitter of said second transistor and the other end connected to said second terminal; and

a third terminal connected to a collector of said second transistor, said first terminal and said third terminal to be connected to respective ends of said load, the ratio between a first voltage drop produced across said second resistor means by an emitter current (Iref) of said first transistor flowing through said first resistor means, the collector and emitter of said first transistor and said second resistor means and a second voltage drop produced across said third resistor means by an emitter current of said second transistor which is substantially equal to a collector current (Ic) of said second transistor flowing through said load, the collector and emitter of said second transistor and said third resistor means being set to a predetermined value, whereby the predetermined amount of a current (Ic) flowing through said load changes at a rate of change which is substantially equal to a rate of change of the voltage of said first power supply, said predetermined value of said ratio $Ic \cdot R_{42}/Iref \cdot R_{43}$ between said first and second voltage drops being determined by the following equation when the voltage of said first DC power supply fluctuates at a rate of change $\xi$:

$$\frac{kT}{q} \ln \frac{1+\gamma}{1+\xi'} + \gamma \cdot Iref \cdot R_{43} - \xi' \cdot Ic \cdot R_{42} = 0$$

where

k: Boltzmann's constant ($8.6 \times 10^{-5}$ eV/k)

T: ambient temperature (absolute temperature)

q: amount of electric charge

$\gamma$: change rate at which the emitter current (Iref) changes with the fluctuation of the voltage of said first DC power supply at the change rate $\xi$

$\xi'$: change rate of the collector current (Ic) of said second transistor which is set to be equal to said change rate $\lambda$

$R_{42}$: resistance of said third resistor means

$R_{43}$: resistance of said second resistor means.

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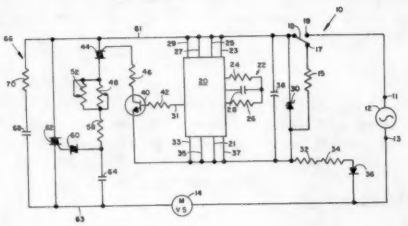
## 4,591,781
## VARIABLE CONTROL CIRCUIT HAVING A PREDETERMINED TIMED OUTPUT

**Ray E. Larson, Fort Worth, Tex., assignor to Power Controls Corporation, San Antonio, Tex.**

**Filed Jun. 6, 1983, Ser. No. 501,027**
**Int. Cl.[4] G05F 3/04**
**U.S. Cl. 323—323** **11 Claims**



1. A circuit for connection across an AC voltage source to permit current flow to a load and, simultaneously limit said current flow and corresponding output of said load to a predetermined time interval, said circuit comprising:

first switch means connected between a first side of said AC voltage source and a first side of said load, a second side of said load being connected to a second side of said AC voltage source, said first switch means having a gate permitting said current flow to said load upon triggering thereof by rectified current;

current rectification means connected between said AC voltage source and said first switch means;

transistor means connected between said current rectification means and said first switch means;

transistor biasing means connected between said transistor means and said current rectification means for biasing said transistor for said predetermined time interval in response to rectified current from said current rectification means, thereby allowing said rectified current to flow to and trigger said gate of said first switch means for said predetermined time interval;

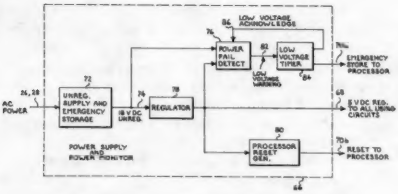
variable power control means connected between said transistor means and said gate of said first switch means, said power control means providing infinitely variable control of power output through said first switch means; and

second switch means for providng a positive ON and OFF connection by said AC voltage source to said circuit and for initiating said predetermined time interval, said second switch means connected to an off-state load in the OFF position thereby positively interrupting said predetermined time interval if said predetermined time interval has not expired when said second switch means is switched to OFF.

## 4,591,782
## POWER SUPPLY AND POWER MONITOR FOR ELECTRIC METER

**Warren R. Germer, Dover, N.H., assignor to General Electric Company, Somersworth, N.H.**

**Filed Apr. 12, 1984, Ser. No. 599,736**
**Int. Cl.[4] G01R** *11/64, 15/08;* **G06F** *11/00*
**U.S. Cl. 324—103 R** **15 Claims**



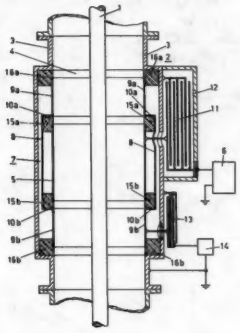

1. An electronic register for an electric meter comprising:
an electronic processor;
said electronic processor including a volatile data storage;
a non-volatile data storage;
unregulated means for producing at least one unregulated DC voltage from an AC supply;
regulated means for producing at least one regulated DC voltage from said unregulated DC voltage;
means for storing a predetermined quantity of stored electric energy from said unregulated DC voltage;
said means for storing being effective for providing a voltage to said regulated means of sufficient amplitude to maintain said regulated DC voltage from said regulated means at its regulated value for at least a first predetermined time following a loss of said AC supply;
a low voltage timer;
means for starting a timing cycle of said voltage timer in response to said voltage from said means for storing decaying below a first threshold;
means for resetting said low voltage timer in response to said voltage from said means for storing increasing above a second threshold;
means responsive to said low voltage timer completing its timing cycle for writing at least some data from said volatile data storage into said non-volatile data storage;
said means for storing having a capacity at least sufficient for maintaining functions of said processor until the completion of said timing cycle and said writing; and
means responsive to a voltage from said regulated means passing a third threshold, lower than said regulated DC voltage, for resetting said electronic processor.

## 4,591,783
## CAPACITIVE VOLTAGE TRANSFORMER

**Georg Mastner, Niederrohrdorf, Switzerland, assignor to BBC Brown, Boveri & Co., Ltd., Switzerland**

**Filed Oct. 4, 1983, Ser. No. 539,076**
**Claims priority, application Switzerland, Oct. 29, 1982, 6308/82**
**Int. Cl.[4] G01R** *15/06;* **H01G** *1/005*
**U.S. Cl. 324—126** **22 Claims**

1. A device for measuring the voltage of a part, which carries high voltage, of an encapsulated, compressed-gas insulated high-voltage system, having a housing (2) which at least partially encloses a gas space (4) which contains a high-voltage electrode (1), an earthed low-voltage electrode (3) which at least partially surrounds the high-voltage electrode, having a measuring electrode (5) which is arranged in the gas space (4) essentially between the high-voltage electrode and the low-voltage electrode and having a signal processing device (6) to which the voltage tapped off the measuring electrode (5) is fed,
a guard electrode (7) arranged in the gas space (4) of which electrode at least a part is located between the measuring electrode (5) and the low-voltage electrode,
an additional capacitor (11) one electrode of which is electrically conductively connected to said measuring electrode (5) and the other electrode of which is earthed;

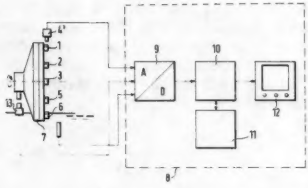


said additional capacitor is constructed as a plate capacitor (11) and is arranged in a container (12) which is connected to the gas space (4); a supplementary capacitor (13) one electrode of which is electrically conductively connected to the guard electrode (7) and the other electrode of which is earthed.

## 4,591,784
## EXAMINATION PROCEDURE FOR THE SPATIAL CHANGE OF AN OBJECT WITH RESPECT TO ITS INITIAL CONDITION

**Jörg Kolitsch, and August Miehle, both of Munich, Fed. Rep. of Germany, assignors to Bayerische Motoren Werke AG, Fed. Rep. of Germany**

**Filed Dec. 22, 1982, Ser. No. 452,030**
**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1981, 3151265; Nov. 5, 1982, 3240948**
**Int. Cl.[4] G01B** *7/28, 11/24, 17/00, 7/14*
**U.S. Cl. 324—208** **1 Claim**




1. A testing method for the configuration of technical functional components, each component having a first axis of rotation, said components being rotatable about a second axis, comprising the steps of
successively rotating said components about said second axis,
sensing rotation about said first axis of an entire configuration of each component during said successive rotations about said second axis,
generating successive first signals in response to said sensing, each of the successive first signals representing a sensed configuration of the component,
comparing successive first signals for producing a second signal representative of a change in an entire configuration of each of said components resulting from rotation of a component about the first axis during rotation about the second axis, and

triggering a warning signal in response to one of a congruence and a difference in said first signals.

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**4,591,785**

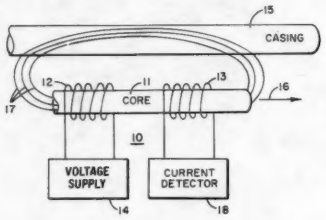
## METHOD FOR DETECTING SOFT SPOTS IN THE HARDNESS OF STEEL CASING

**Gustave L. Hoehn, Jr., Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Oct. 25, 1983, Ser. No. 545,332**

**Int. Cl.[4] G01N** *27/80, 27/82;* **G01R** *33/12*

**U.S. Cl. 324—239** **5 Claims**




**1**. In a method for detecting soft spots in the hardness of steel casing in which a magnetizing force is traversed along the length of the steel casing to create a flux density along the steel casing as it is traversed by the magnetizing force, and in which the flux density induced in the steel casing is measured to detect any change in the flux density caused by the presence of a soft spot in the hardness of the steel casing, the improvement comprising:

(a) limiting said magnetizing force to maintain said flux density in the steel casing below the point of flux density intersection along the initial magnetization curves for hard and soft steels so as to maintain a continuing flux density that is greater for the soft spots in said steel casing than for the hard spots, and

(b) identifying a soft spot in said steel casing when there is an increase in said measured flux density.

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**4,591,786**

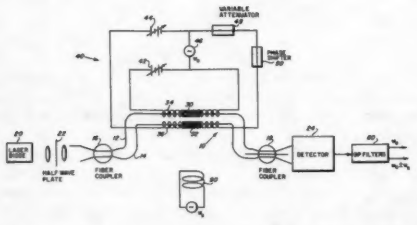
## FIBER-OPTIC MAGNETIC GRADIOMETER WITH VARIABLE MAGNETIC BIASING FIELDS

**Kee P. Koo, Alexandria, and George H. Sigel, Jr., Great Falls, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 17, 1984, Ser. No. 641,656**

**Int. Cl.[4] G01R** *33/022, 33/023;* **G01B** *9/02*

**U.S. Cl. 324—244** **9 Claims**




**1**. A fiber-optic magnetic gradiometer for measuring both ac and dc magnetic-field gradients, comprising:

an interferometer including a first optical fiber arm, a second optical fiber arm, each having first and second ends, input coupling means for coupling light into one end of said first and second arms, and output coupling means for coupling light together at the second ends of first and second arms;

first magnetic means disposed around a portion of said first arm for changing the length of said first arm in accordance with a magnetic field;

first variable magnetic bias means for applying first dc and ac magnetic bias fields to said first magnetic means;

second magnetic means disposed around a portion of said second arm for changing the length of said second arm in accordance with a magnetic field;

second variable magnetic bias means for applying second dc and ac magnetic bias fields to said second magnetic means;

a control circuit for controlling the dc and ac magnetic bias fields being applied by said first and second variable magnetic bias means;

said first and second magnetic bias means acting to balance out ambient environmental magnetic fields and to compensate for unequal lengths of said first and second arms and for unequal responses by said first and second magnetic means to magnetic fields;

means for detecting the light coupled together at said output coupling means; and

means for obtaining the signal components from the output of said detecting means at the ac magnetic bias frequency $W_o$ in order to obtain a signal proportional to the external dc gradient magnetic field, and for obtaining the signal components from the output of said detecting means at one of the frequencies $w_o \pm w_s$, where $w_s$ is the external ac magnetic field frequency in order to obtain a signal proportional to the external ac gradient magnetic field.

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**4,591,787**

## MULTI-CHANNEL DEVICE WITH SQUIDS AND SUPERCONDUCTING GRADIOMETERS FOR THE MEASUREMENT OF WEAK MAGNETIC FIELDS PRODUCED BY VARIOUS FIELD SOURCES

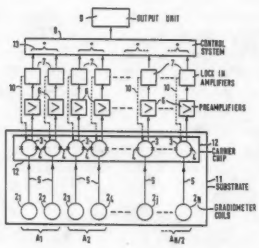
**Eckhardt Hoenig, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Dec. 16, 1983, Ser. No. 562,494**

**Claims priority, application Fed. Rep. of Germany, Dec. 22, 1982, 3247585**

**Int. Cl.[4] G01R** *33/02*

**U.S. Cl. 324—248** **9 Claims**




**1**. In a multi-channel device for the measurement of variable magnetic fields produced by various field sources located within a predetermined range of distances from the surface of a body, with field strengths of less than $10^{-10}$T, where the measuring device includes in each channel a superconducting quantum interference device (SQUID), a gradiometer comprising superconducting coils with predetermined dimensions and superconducting connecting elements between the quantum interference device and the gradiometer, and which is provided, in addition, with electronic equipment for the evaluation, processing and presentation of the information obtained at the quantum interference devices the improvement comprising, individual gradiometer coils ($2_j$; $17_j$; $19_j$) the dimensions of which being adjusted to provide the optimum sensitivity for the smallest distance within the predetermined range and means for combining the signals from a plurality of individual predetermined gradiometer coils into a signal from the corre-

sponding one of groups ($D_1$ to $D_4$; $K_1$ to $K_4$) of gradiometer coils, the number of signals from the coils being combined increasing the response for a larger distance within the predetermined range wherein the larger distance essentially corresponds to the distance from the surface of the body to the respective magnetic field source to be detected.

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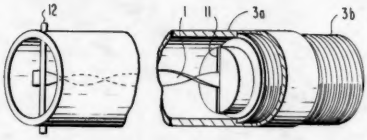
**4,591,788**

## MAGNETIC FIELD SENSING DEVICE

**Kaneo Mohri, Fukuoka, and Toshinobu Kageyama, Aichi, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan**

**Filed Sep. 7, 1982, Ser. No. 415,298**
**Claims priority, application Japan, Sep. 9, 1981, 56-141853**
**Int. Cl.[4] G01R *33/00*; G01P *3/66*; H01F *1/02***
**U.S. Cl. 324—260** **5 Claims**




1. A magnetic field sensing device comprising a ribbon of amorphous magnetic material having at least one twist therein along the axis of the ribbon between the ends thereof and means for supporting said strip in twisted condition.

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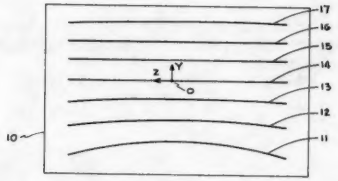
**4,591,789**

## METHOD FOR CORRECTING IMAGE DISTORTION DUE TO GRADIENT NONUNIFORMITY

**Gary H. Glover, Waukesha, and Norbert J. Pelc, Wauwatosa, both of Wis., assignors to General Electric Company, Milwaukee, Wis.**

**Filed Dec. 23, 1983, Ser. No. 565,256**
**Int. Cl.[4] G01R *33/20***
**U.S. Cl. 324—307** **13 Claims**




1. A method for correcting distortion in NMR images composed of a multi-dimensional array of pixel elements, said distortion arising from magnetic field gradient nonuniformity in at least one dimension of the array, said distortion being manifested by displacement of pixel elements relative to desired positions thereof by an amount related to the degree of gradient nonuniformity, said method comprising the steps:

defining the expected degree of pixel displacement due to the magnetic field nonuniformity in at least one dimension of the pixel array; and

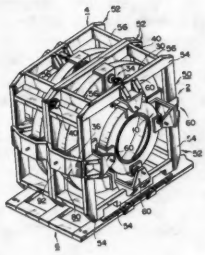
applying a geometric correction to predetermined ones of said displaced pixel elements as determined by the expected degree of pixel displacement to minimize pixel displacement from the desired position in a corrected image.

**4,591,790**

## DIAGNOSTIC NUCLEAR MAGNETIC RESONANCE APPARATUS

**Ryouichi Takahashi, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Japan**

**Filed Apr. 25, 1984, Ser. No. 603,676**
**Claims priority, application Japan, Apr. 30, 1983, 58-66074[U]**
**Int. Cl.[4] G01R *33/20*; H01F *27/30***
**U.S. Cl. 324—318** **15 Claims**



1. A diagnostic nuclear magnetic resonance apparatus, which applies a magnetostatic field to a subject to produce a nuclear magnetic resonance phenomenon, detects a nuclear magnetic resonance signal delivered from the subject, and obtains information on the internal conditions of the subject on the basis of the signal, comprising:

a pair of coil units each including a frame structure, a large coil and a small coil adapted to generate magnetic fields when energized, and supporting means for fixing the large and small coils individually to the frame structure;

a base mounted with said pair of coil units; and

assembling means for fixing and separating the respective frame structures of the coil units to and from each other and to and from the base in a manner such that the respective large coils of the coil units adjoin each other.

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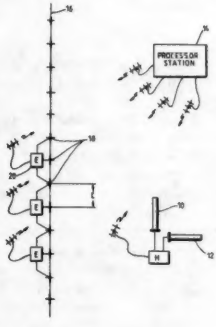
**4,591,791**

## ELECTROMAGNETIC ARRAY PROFILING SURVEY METHOD

**Francis X. Bostick, Jr., Austin, Tex., assignor to Board of Regents, University of Texas System, Austin, Tex.**

**Filed Jul. 31, 1984, Ser. No. 636,232**
**Int. Cl.[4] G01V *3/08***
**U.S. Cl. 324—350** **9 Claims**




1. An electromagnetic geophysical survey method, comprising:

measuring the variations in the earth's magnetic field in at

least two horizontal non-parallel directions at at least one point in the survey area;

simultaneously with the measurement of the variations of the magnetic field, measuring the variations in the earth's electrical field parallel to a survey line at a plurality of points along the survey line;

transforming the measured variations in the magnetic field and electrical field into frequency components;

calculating as a function of frequency the horizontal component of the earth's magnetic field orthogonal to the direction of the measured electrical field at each of the points from the measurements of the magnetic field in the two non-parallel directions;

calculating as a function of frequency the impedance at each point, the impedance being ratio between the measured electrical field at that point and the horizontal component of the earth's magnetic field orthogonal to the direction of the measured electrical field;

calculating for predetermined frequencies the weighted averages of the impedances such that the number of impedance entered into each weighted average increases with decreasing frequency in such a way that the number is substantially proportional to the effective depth of penetration into the earth of an electromagnetic wave of that frequency;

calculating the distribution of conductivity in the earth below the survey line as a function of depth from the weighted averages of the impedances.

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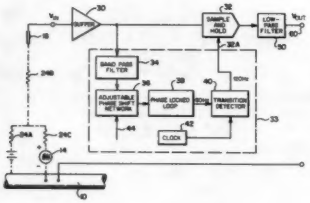
**4,591,792**

## METHOD AND APPARATUS FOR MEASURING THE POLARIZED POTENTIAL OF A BURIED OR SUBMERGED STRUCTURE PROTECTED BY IMPRESSED CURRENT

**John R. Birchmeier, Columbus; George T. Ruck, Worthington; Neil G. Thompson, Dublin, and Thomas J. Barlo, Columbus, all of Ohio, assignors to Gas Research Institute, Chicago, Ill.**

**Filed Feb. 8, 1984, Ser. No. 578,069**
**Int. Cl.[4] G01N *27/00***
**U.S. Cl. 324—425** **11 Claims**



**5.** An apparatus for measuring the polarized potential, which is generated at the boundary between a submerged structure and its surrounding medium, in the presence of a compensating cathodic or anodic current from a protection system having a periodic, rectified voltage source connected between said structure and a counter electrode submerged in said medium, said apparatus being of the type having an input connected to said structure and to a reference electrode inserted in said medium, said apparatus comprising:

(a) a sample-and-hold means having its inputs connected to said apparatus input and having a sampling control input;

(b) an adjustable trigger signal generator means for generating a periodic trigger signal at an integral division of the frequency of said voltage source, said generator means having a phase control input for selectively varying the phase of said trigger signal with respect to the phase of said voltage source, said trigger signal generator means also having its output connected to the control input of said sample-and-hold means for initiating the sampling of the input voltage between said reference electrode and said medium in response to a trigger signal; and

(c) an averaging means connected to the output of said sample-and-hold means for outputting a signal proportional to the average amplitude of the sample levels over a recent period of time.

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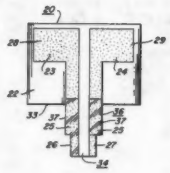
**4,591,793**

## AGGREGOMETER ELECTRODE STRUCTURES

**Arthur H. Freilich, 2025 Olcott Ave., Ardmore, Pa. 19003**

**Filed Jun. 14, 1984, Ser. No. 620,503**
**Int. Cl.[4] G01N *27/07***
**U.S. Cl. 324—446** **20 Claims**



**1.** A platelet aggregation eectrode assembly comprising in combination,

(a) an electrically non-conductive and blood non-reactive substrate for supporting a pair of electrodes,

(b) a pair of first and second electrically conductive spaced apart electrodes adhered to and extending for a distance along said substrate, said electrodes each having a first conductive region for electrical connection to a measuring circuit, and each having a second conductive region for immersion in a platelet carrying medium, said first and second conductive regions of each electrode being spaced apart from each other by an intervening length of each said electrode, and

(c) a layer of electrical insulating material entirely overlying each of said pair of electrodes except at said first and second conductive regions of each said electrode.

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**4,591,794**

## GAS TURBINE ACCESS PORT PLUG ELECTROSTATIC PROBE

**Alan B. Shattuck, Lake Park, and Robert P. Couch, Palm Beach Gardens, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Dec. 28, 1982, Ser. No. 454,113**
**Int. Cl.[4] G01N *27/62***
**U.S. Cl. 324—464** **1 Claim**

**1.** An electrostatic probe for detecting ions in a gas path of a gas turbine engine having a fan duct with a borescope access

port through inner and outer walls thereof, said port including gas seal surfaces in the inner and outer walls of the fan duct and lock means in one of said fan duct walls for engaging a plug for closing off said port, comprising:

a hollow metallic wall structure including a respective seal for interfacing with each of said gas seal surfaces and latch means cooperating with said lock means to hold said wall structure in place with said respective seals engaging said seal surfaces and with a proximal end of said wall structure adjacent the inner fan duct wall;

a central conductor disposed within and extending beyond the proximal end of said wall structure, the proximal end of said central conductor forming an exposed electrode tip;

an outer cylindrical conductor disposed within and extending beyond the distal end of said wall structure,

electrical insulating material disposed between said central conductor and said outer cylindrical conductor to support said central conductor in electrical isolation within said outer cylindrical conductor; and

a coaxial cable connector, the outer conductor of which is connected to the distal end of said outer cylindrical conductor and the inner conductor of which is connected to the distal end of said central conductor.

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**4,591,795**

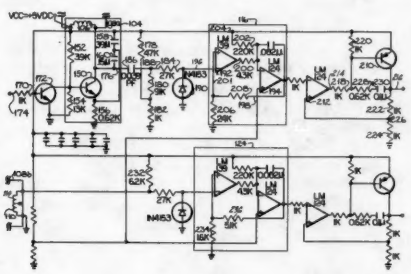
## SIGNAL CONDITIONING CIRCUIT FOR L/R VDT SENSORS

**Gary A. McCorkle, Tucson, Ariz., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Oct. 1, 1984, Ser. No. 656,570**

**Int. Cl.[4] H03K** *5/00, 5/22;* **G08C** *19/06*

**U.S. Cl. 328—5** **4 Claims**



1. Signal conditioning circuitry for providing an output signal indicative of L/R VDT primary coil excitation waveform voltage amplitude and for providing an output signal indicative of the voltage across a selected one of the L/R VDT's secondary coils and therefore indicative of L/R VDT displacement on one side of the null only, comprising:

a first linear slope peak detector, responsive to a present rectified signal value of the primary coil excitation voltage amplitude for comparing said primary's present rectified signal value to a stored first peak detector output signal indicative of the peak amplitude of a past rectified signal value of said primary excitation and for changing said stored first peak detector output signal value to correspond to and be indicative of said present primary rectified signal value; and

a second linear slope peak detector responsive to a present rectified signal value of the selected secondary coil's voltage amplitude for comparing said present secondary rectified signal value to a stored second peak detector output signal indicative of the peak amplitude of a past secondary rectified signal value and for changing said stored second peak detector output signal value to correspond to and be indicative of said present rectified rectified signal value.

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**4,591,796**

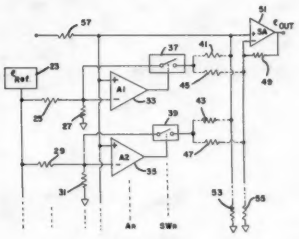
## PERFORMANCE PREDICTABLE LINEARIZING OR FUNCTION MODIFYING CIRCUIT

**Otto Muller-Girard, Rochester, and Alan Miller, Pittsford, both of N.Y., assignors to Transmation, Inc., Rochester, N.Y.**

**Filed Mar. 26, 1984, Ser. No. 593,430**

**Int. Cl.[4] H03K** *4/10, 5/12*

**U.S. Cl. 328—184** **16 Claims**



1. A linearizing circuit which comprises:

(a) a plurality of slope altering circuits, and

(b) output means coupled to said slope altering circuits,

(c) each of said slope altering circuits including means responsive to a different predetermined input voltage for altering the slope of the output thereof to one of a greater or lesser value,

(d) at least a predetermined one of said circuits providing a greater slope output than the input thereto and at least a predetermined one of said circuits providing a smaller slope output then the input thereto,

(e) said circuit providing a smaller slope comprising:

(f) a comparator having a pair of inputs for providing a signal output responsive to a predetermined difference in signals applied to said inputs,

(g) circuit output means and reference voltage means connected to the inputs of said comparator, and

(h) means responsive to said signal output from said comparator for placing a predetermined resistance between said circuit output and said reference voltage.

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**4,591,797**

## PSK DEMODULATOR HAVING AN AFC CIRCUIT

**Yoshio Tanimoto, and Masaaki Atobe, both of Tokyo, Japan, assignors to NEC Corporation, Japan**

**Filed Mar. 21, 1985, Ser. No. 714,377**

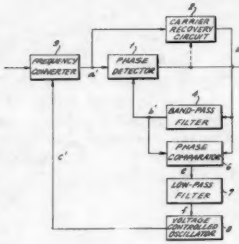
**Claims priority, application Japan, Mar. 28, 1984, 59-59818**

**Int. Cl.[4] H03D** *3/02;* **H04L** *27/22*

**U.S. Cl. 329—50** **3 Claims**

1. A PSK demodulator comprising: voltage controlled oscillator means responsive to a control signal; frequency converter means for frequency converting an input PSK signal as a function of the output of said voltage controlled oscillator means; carrier recovery circuit means for recovering a carrier wave from the output of said frequency converter means; band-pass filter means receiving said recovered carrier wave; phase detector means for phase detecting the output of said frequency converter means as a function of the output of said band-pass filter means and providing a demodulated signal; phase com-

parator means for detecting the phase difference between the input and output signals of said band-pass filter means; and




low-pass filter means responsive to the output of said phase comparator means for providing said control signal.

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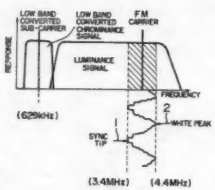
**4,591,798**

## FM SIGNAL DEMODULATION CIRCUIT

**Kuniaki Miura, Ibaraki; Yasunori Kobori, Katsuta; Isao Fukushima, Katsuta; Makoto Shiomi, Katsuta, and Kenji Kano, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 17, 1984, Ser. No. 601,290**
**Claims priority, application Japan, Apr. 18, 1983, 58-66954**
**Int. Cl.[4] H03D *1/18***
**U.S. Cl. 329—102** **8 Claims**




1. An FM signal demodulation circuit comprising:
a first inverter for receiving a first FM signal;
a second inverter for receiving a second FM signal of a phase opposite to that of said first FM signal;
a capacitor connected between output terminals of said first and second inverters;
a third inverter connected to receive an output signal of said first inverter;
a fourth inverter connected to receive an output signal of said second inverter; and
logical product means for ANDing output signals of said third and fourth inverters.

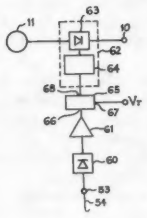
5. An FM signal demodulation circuit comprising:
a first inverter for receiving a first FM signal;
a second inverter for receiving a second FM signal of a phase opposite to that of said first FM signal;
a capacitor connected between each of the output terminals of said first and second inverters and ground;
a third inverter connected to receive an output signal of said first inverter;
a fourth inverter connected to receive an output signal of said second inverter; and
logical product means for ANDing output signals of said third and fourth inverters.

**4,591,799**

## HIGH POWER KLYSTRON AMPLIFIER FOR SUPPLYING A VARIABLE LOAD

**Georges Faillon, Meudon, and Bernard Epsztein, Sceaux, both of France, assignors to Thomson-CSF, Paris, France**

**Filed Apr. 27, 1984, Ser. No. 604,816**
**Claims priority, application France, May 3, 1983, 83 07362**
**Int. Cl.[4] H03F *3/56***
**U.S. Cl. 330—45** **5 Claims**




1. A power amplifying klystron for supplying a variable load, comprising an electron gun, a collector, and between said electron gun and said collector a succession of cavity resonators with at least an input cavity means for receiving an ultra-high frequency signal to be amplified and an output cavity with an interaction gap, a probe disposed in the output cavity for detecting a signal Vs proportional to the voltage Vc at the level of the interaction gap of the output cavity and means provided between the probe and the input cavity, using the signal Vs for adjusting the amplitude of the ultra-high frequency signal so that the voltage Vc at the level of the interaction gap is at the optimum value Vc1 or Vc2.

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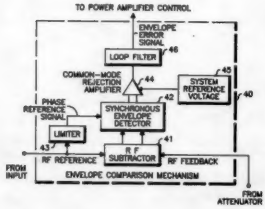
**4,591,800**

## LINEAR POWER AMPLIFIER FEEDBACK IMPROVEMENT

**George F. Opas, Park Ridge, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Oct. 1, 1984, Ser. No. 656,552**
**Int. Cl.[4] H03F *1/32, 1/26***
**U.S. Cl. 330—86** **31 Claims**




1. A linear power amplifier feedback system for amplifying amplitude modulated radio frequency (RF) signals, said feedback system comprising:
power amplifier means for amplifying RF signals; said power amplifier means having its input coupled to a system input port for receiving the RF signal to be amplified and having its output coupled to a system output port at which the amplified RF signal is to be provided;
power amplifier control means coupled to said power amplifier means for controlling the amplitude of the output RF signal of said power amplifier means in response to an envelope error signal;
attenuator means coupled to said system output port for producing an attenuated output RF signal;

RF combining means for linearly combining the input RF signal at said system input port and said attenuated output RF signal thereby producing an RF difference signal;

envelope detection means for detecting the amplitude of said RF difference signal thereby producing said envelope error signal coupled to said power amplifier control means;

error signal correction means for correcting the DC level of said envelope error signal in response to variations in DC level output of said envelope detection means thereby maintaining DC balance of said linear power amplifier feedback system.

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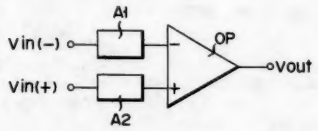
## 4,591,801
## DIFFERENTIAL AMPLIFIER CIRCUIT

**Akira Yamaguchi, Yokohama, and Eiji Masuda, Kawasaki, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan**

**Filed Dec. 9, 1983, Ser. No. 559,721**
**Claims priority, application Japan, Dec. 10, 1982, 57-216376**
**Int. Cl.[4] H03F *3/45***
**U.S. Cl. 330—261** **6 Claims**




1. A differential amplifier circuit comprising:

a differential amplifier having an inverting input terminal and a non-inverting input terminal; and

first and second attenuators which are respectively connected to said inverting input terminal and said non-inverting input terminal, means for applying first and second circuit input voltages to said inverting input terminal and said non-inverting input terminal through said first and second attenuators, respectively;

said first and second attenuators having the same circuit construction and designed to attenuate the amplitudes of the first and second input voltages so that their amplitudes fall within a linear range of operation of said differential amplifier, and to set the input voltages at an operating point of said differential amplifier.

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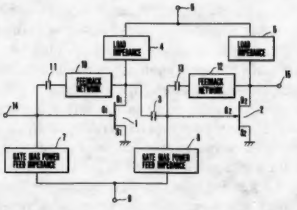
## 4,591,802
## FEEDBACK AMPLIFIER CIRCUIT INCLUDING CASCADE CONNECTED FIELD EFFECT TRANSISTORS

**Hiroshi Asazawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed May 3, 1985, Ser. No. 730,335**
**Claims priority, application Japan, May 8, 1984, 59-90225**
**Int. Cl.[4] H03F *3/16***
**U.S. Cl. 330—277** **16 Claims**




1. An amplifier circuit comprising n number of amplifier stages each comprising a field-effect transistor, cascade-connected to each other (n is an integer equal to or more than two) through interstage capacitors, respectively,

the improvement wherein

(a) the (i−1)th amplifier stage (i=2, 3, 4 . . . n) is provided with a feedback circuit comprising impedance circuit means functioning to allow a dc component of a feedback signal to pass therethrough, said impedance circuit means provided in said (i−1)th amplifier stage being coupled between respective gates of said (i−1)th-stage and the i-th stage field-effect transistors, and

(b) the i-th amplifier stage is provided with a feedback circuit comprising impedance circuit means having the same function as that of said impedance circuit means of said feedback circuit provided in said (i−1)th amplifier stage, said impedance circuit means provided in said i-th amplifier stage being coupled between respective drains of the i-th and the (i−1)th amplifier stages.

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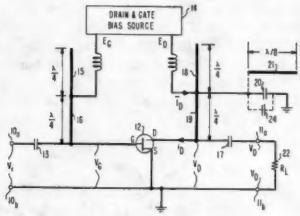
## 4,591,803
## LINEAR FET POWER AMPLIFIER

**Adel A. M. Saleh, Holmdel, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed May 29, 1984, Ser. No. 614,527**
**Int. Cl.[4] H03F *3/16, 3/60***
**U.S. Cl. 330—277** **4 Claims**




1. A power amplifier arrangement comprising:

an input and an output terminal;

a field effect transistor (FET) comprising a gate electrode coupled to the input terminal, a source electrode, and a drain electrode coupled to the output terminal, the FET including a transfer characteristic which includes a parabolic region; and

drain electrode biasing means comprising (a) a first and a second quarter-wave transmission line section connected in series, one end thereof being connected to the drain electrode while the interconnection point between the two quarter-wave transmission line sections is connected to be responsive to a drain bias from a bias supply to cause the amplifier to operate over a predetermined portion of the parabolic region of the FET transfer characteristics, (b) means connected between the interconnection point of the first and second quarter-wave transmission line sections and the source electrode for preventing envelope-induced variations of the drain bias voltage and for providing a short circuit to the drain electrode for a second harmonic of an input signal, and (c) a blocking capacitor disposed between the drain electrode and the output terminal.

4,591,804

## CASCODE CURRENT-SOURCE ARRANGEMENT HAVING DUAL CURRENT PATHS

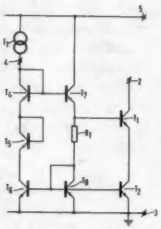
Adrianus J. M. van Tuijl, Nijmegen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 19, 1985, Ser. No. 703,147

Claims priority, application Netherlands, Feb. 29, 1984, 8400637

Int. Cl.[4] H03F *3/04*

U.S. Cl. 330—288 3 Claims



1. A cascode current-source arrangement comprising a first and a second transistor whose collector-emitter paths are arranged in series between a first terminal and a common second terminal, and a third transistor connected as a diode, whose base is connected to the base of the second transistor and whose emitter is connected to the common second terminal, characterized in that the arrangement further comprises a first input current path which comprises, between a third terminal and the common second terminal, the series arrangement of a fourth transistor connected as a diode, a diode and the collector-emitter path of a fifth transistor, and a second current path which comprises, between a fourth terminal, connected to the base of the fourth transistor, and the common second terminal the series arrangement of the base-emitter path of a sixth transistor, a resistor and the base-emitter path of the third transistor, whose base is further connected to the base of the fifth transistor, the base of the first transistor being connected to that end of the resistor which is remote from the third transistor.

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4,591,805

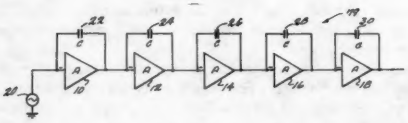
## ADAPTIVE BANDWIDTH AMPLIFIER

Frederick J. Highton, Lynchburg, Va., assignor to General Electric Company, Lynchburg, Va.

Filed May 30, 1984, Ser. No. 615,232

Int. Cl.[4] H03F *1/34;* H03G *3/20*

U.S. Cl. 330—294 18 Claims



1. An adaptive bandwidth FM IF amplifier for use in an FM receiver to amplify IF frequency modulated signals having an expected range of varying amplitude, comprising:

an input port,

an output port,

two or more amplifier stages having respective input and output nodes connected in cascade between said input and output ports, said amplifier stages being arranged to be gain-saturated when processing IF signals having amplitude levels in an upper portion of said expected range; and

adaptive means associated with each amplifier stage for automatically varying the effective signal transmission bandwidth from said input to said output port as a function of the amplitude of a signal applied to said input port as gain-saturation occurs in at least one of the cascaded amplifiers.

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4,591,806

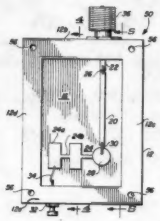
## DIELECTRIC RESONATOR STABILIZED OSCILLATOR AND METHOD FOR OPTIMIZING THE OPERATING CHARACTERISTICS THEREOF

Richard C. Havens, 8626 E. Roma Ave., Scottsdale, Ariz. 85251

Filed Jul. 2, 1984, Ser. No. 627,056

Int. Cl.[4] H03B *5/38*

U.S. Cl. 331—96 9 Claims



1. In a dielectric resonator stablized oscillator including transmission line circuitry disposed within a housing assembly consisting of a first housing member mounted to a second housing member, a semiconductor device mounted to the transmission line circuitry, a dielectric resonator in spatial relationship to the transmission line circuitry and bias means for providing an operating potential to the oscillator, the improvement comprising:

means for mounting the dielectric resonator to the first housing member wherein the dielectric resontator is held in spatial relationship to the transmission line circuitry; and

means for permitting movement of said first housing member with respect to the second housing member for adjusting said spatial relationship of the dielectric resonator with respect to the transmission line circuitry whereby the oscillator characteristics are varied as the dielectric resonator is moved, the first housing member being fixedly mounted to the second housing member thereafter.

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4,591,807

## LOW POWER, LOW VOLTAGE OSCILLATOR

Walter L. Davis, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 3, 1984, Ser. No. 677,276

Int. Cl.[4] H03B *5/36;* H03F *3/04*

U.S. Cl. 331—116 R 14 Claims

1. A low power, low voltage oscillator circuit, comprising in combination:

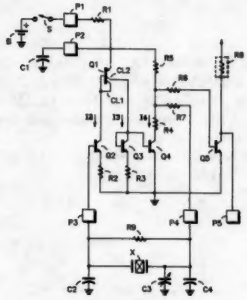
an amplifier having an input and an output, said amplifier having at least a first, second and third stage, each stage having an input, an output, and an associated output current, wherein said first stage input is connected to said amplifier input, and said third stage output is connected to said amplifier output, said stages being interconnected in a cascade fashion, whereby the output of a preceding stage is connected to the input of the following stage;

said second stage including a current mirror circuit wherein said second stage output current is substantially a first fixed multiple of the preceding stage output current;

said third stage including a current mirror circuit wherein said third stage output current is substantially a second fixed multiple of the preceding stage output current;

a feedback biasing means, connected between said amplifier

output and said amplifier input, for biasing said ampifier stages in their respective operating regions; and



a tuned circuit means, connected between said amplifier output and said amplifier input, for selecting the frequency of oscillation.

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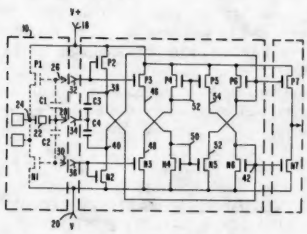
**4,591,808**

## HIGH EFFICIENCY OSCILLATOR OUTPUT STAGE AND METHOD OF OPERATION

**Charles H. Lucas, Newport Beach, and Lanny L. Lewyn, Laguna Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Dec. 26, 1984, Ser. No. 686,365**
**Int. Cl.[4] H03B *5/32***
**U.S. Cl. 331—116 FE** **6 Claims**



1. A high efficiency oscillator circuit including:

(a) an input transistor pair serially connected via a common node which is coupled to a quartz crystal for oscillating at the resonant frequency of the crystal;

(b) an output current mirror driver connected to an output stage and operative for producing an output signal at the frequency of the crystal; and

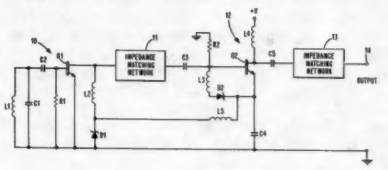
(c) an intermediate current mirror stage cross-connected between said input transistor pair and said output current mirror driver for applying currents proportional to the sum or weighted sum of the currents flowing in each transistor of said input transistor pair to said output current mirror driver, whereby current imbalances in said input transistor pair are not reflected in the substantially equal and balanced currents flowing in said output current mirror driver and said output stage thereby minimizing distortion in the output signal from said output stage.

**4,591,809**

## HIGH FREQUENCY POWER SOURCE

**Robert J. Regan, Needham; Scott J. Butler, Auburn, and Zvi Ben-Aharon, Framingham, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Dec. 24, 1984, Ser. No. 685,429**
**Int. Cl.[4] H03B *5/00*; H03F *3/04***
**U.S. Cl. 331—117 R** **10 Claims**



1. A high frequency power source comprising

an output connection;

an oscillator section for producing a high frequency signal including an oscillator transistor having first, second, and third electrodes;

an amplifier section coupled to the oscillator section for producing an amplified high frequency signal;

said amplifier section including

an amplifier transistor having first, second, and third electrodes,

means for connecting the first electrode of the amplifier transistor to a source of dc operating potential,

dc biasing means connected between the second and third electrodes of the amplifier transistor for producing a dc bias voltage therebetween, and

output means including dc blocking means coupling the first electrode of the amplifier transistor to said output connection;

dc connecting means including rf blocking means coupling the second electrode of the amplifier transistor to the first electrode of the oscillator transistor whereby a dc conductive path is provided from the source of operating potential through the amplifier transistor to the oscillator transistor; and

rf connecting means including dc blocking means coupling the first electrode of the oscillator transistor to the third electrode of the amplifier transistor whereby an rf conductive path is provided.

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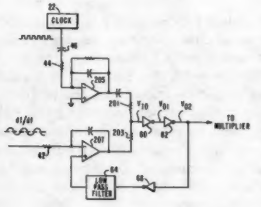
**4,591,810**

## PULSE WIDTH MODULATOR FOR ELECTRONIC WATTHOUR METERING

**Raymond W. Mackenzie, Pittsburgh, and Theodore M. Heinrich, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 19, 1984, Ser. No. 590,110**
**Int. Cl.[4] H03K *7/00***
**U.S. Cl. 332—9 R** **6 Claims**



1. Pulse width modulator apparatus comprising:

means for providing a first signal having a triangular waveform;

means for providing a second signal proportional to a quantity being measured;

summing means for providing a summation signal proportional to the instantaneous sum of said first and second signals;

a plurality of series-connected inverters having an input connected to the output of said summing means, the first of said plurality of inverters being biased so as to switch its output state approximately at the midpoint of said first signal in the absence of said second signal, the output of the last of said plurality of inverters providing a pulse signal having a duty cycle proportional to said second signal;

negative feedback means for connecting a portion of the signal present at said inverter output to said summing means; and

a low pass filter connected in series with said feedback means such that only DC components of said output signal are provided to said summing means.

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**4,591,811**

## GENERATOR FOR GENERATING AN AMPLITUDE MODULATED SIGNAL CORRESPONDING TO A CARRIER SIGNAL MODULATED BY AN INFORMATION SIGNAL

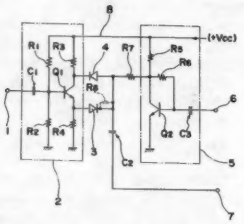
**Takeshi Nakamura, Uji, Japan, assignor to Murata Manufacturing Co., Ltd., Kyoto, Japan**

**Filed Nov. 1, 1984, Ser. No. 667,372**

**Claims priority, application Japan, Nov. 25, 1983, 58-182363[U]**

**Int. Cl.⁴ H03C *1/00***

**U.S. Cl. 332—31 T** **3 Claims**




1. An amplitude-modulated generator which comprises:

a phase dividing circuit having a first transistor to which a modulating signal is supplied, said first transistor generating a first signal from its emitter and a second signal from its collector, said first and second signals having a waveform which is similar to that of said modulating signal but the phase of said first signal being opposite to that of the second signal;

a first switching means connected to the emitter of said first transistor;

a second switching means connected to the collector of said first transistor, said first and second switching means connected to said first transistor in opposite direction;

a driving means for driving said first and second switching means in accordance with a carrier wave having a waveform which consists of alternately repeated first and second half-cycles such that said first and second switching means are turned on and off, respectively, during the first half-cycles of said carrier wave, and said first and second switching means are turned off and on, respectively, during the second half-cycles of said carrier wave; and

an output means connected to said first and second switching means for outputting said first and second signals alternately at a rate corresponding to the frequency of said carrier wave, whereby a signal produced from said output means is substantially equivalent to an amplitude-modulated signal consisting of a carrier wave which is amplitude modulated by the modulating signal.

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**4,591,812**

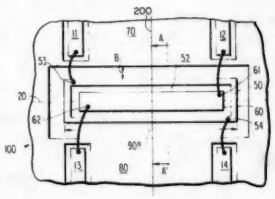
## COPLANAR WAVEGUIDE QUADRATURE HYBRID HAVING SYMMETRICAL COUPLING CONDUCTORS FOR ELIMINATING SPURIOUS MODES

**Ronald E. Stegens, Brookeville, and Gary G. Hawisher, Germantown, both of Md., assignors to Communications Satellite Corporation, Washington, D.C.**

**Filed Nov. 22, 1982, Ser. No. 443,833**

**Int. Cl.⁴ H01P *5/18***

**U.S. Cl. 333—116** **9 Claims**




1. A coplanar waveguide quadrature hybrid of the type comprising a dielectric substrate, a pair of first conductors, including an input conductor and an isolation conductor, and first and second output conductors, all formed on a surface of said substrate and disposed between grounded conductors also formed on said surface, and coupling means formed on said surface for coupling together said input, isolation and output conductors, said coupling means having a center line of transmission, the improvement characterized in that said coupling means comprises:

a first coupling conductor disposed on said substrate surface and electrically connected to said first output conductor and one of said first conductors; and

a second coupling conductor disposed on said substrate surface and electrically connected to the other of said first conductors and to said second output conductor, said second coupling conductor surrounding at least a portion of said first coupling conductor;

each of said first and second coupling conductors being symmetrically disposed with respect to said center line of transmission.

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**4,591,813**

## HYBRID JUNCTION HAVING THREE CONDUCTIVE LINES COAXIALLY DISPOSED

**Igor Miletic, Scarborough, Canada, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 14, 1984, Ser. No. 650,463**

**Claims priority, application Canada, Sep. 22, 1983, 437316**

**Int. Cl.⁴ H01P *5/16***

**U.S. Cl. 333—117** **3 Claims**

3. A hybrid junction device for operating at a wavelength λ, said device comprising:

(a) a central conductive means extending between first and second ends thereof over a length λ/4;

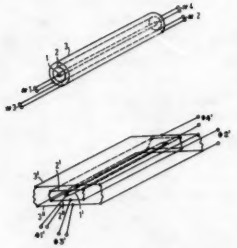
(b) an outer conductive means extending between first and second ends thereof over a length λ/4, said outer conductive means having electrically-connected portions thereof equidistantly spaced from respective opposite sides of the central conductive element;

(c) an intermediate conductive means extending between first and second ends thereof over a length λ/4, said intermediate conductive means having electrically-connected portions thereof disposed between and equidistantly

spaced from the central conductive means and the outer conductive means;

(d) a first port electrically connected to the first ends of the central and outer conductive means;

(e) a second port electrically connected to the second ends of the intermediate and outer conductive means;



(f) a third port electrically connected to the first ends of the intermediate and outer conductive means; and

(g) a fourth port electrically connected to the second ends of the central and outer conductive means.

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**4,591,814**

## ELECTRONIC COMPONENT COMPRISING PRINTED CIRCUIT ELEMENTS DISPOSED ON A FOLDED TAPE AND METHOD OF MAKING SUCH COMPONENT

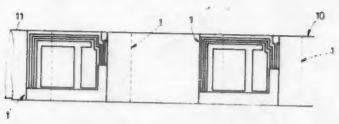
**Katsuo Ito; Yasushi Senga, both of Kanazawa, and Yoshio Murata, Unoke, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan**

**Filed Jun. 14, 1983, Ser. No. 504,238**

**Claims priority, application Japan, Jun. 16, 1982, 57-104639**

**Int. Cl.[4] H05K *1/16***

**U.S. Cl. 333—177** **11 Claims**



1. An electronic component tape comprising:

an electrically non conductive elongate tape having a length dimension and a width dimension, said tape being folded along the length dimension thereof to define a fold having a first region on one side of said fold and a second region on the other side of said fold;

a plurality of pairs of first and second electrical elements located, respectively, on said first and second regions of said tape, each pair of elements being located spacedly along the length of said tape and generally such that when said tape is folded said first and second electrical elements overlap at least partially one another as to provide magnetic coupling between said elements; each one of said elements including:

a dielectric plate having first and second opposing surfaces;

a conductive pattern located on said opposing surfaces of said dielectric plate, said conductive pattern having a shape which defines an inductive element and a capacitive element; and a plurality of sets of terminals equal in number to the number of pairs of electrical elements, each set of terminals including at least one terminal and being electrically connected to a respective one of said pairs of elements, each pair of electrical elements being spaced from adjacent pairs of electrical elements to enable said tape to be cut into a plurality of individual electrical components each containing one of said pair of elements.

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**4,591,815**

## SURFACE-PROPAGATING ACOUSTIC WAVE DEVICE

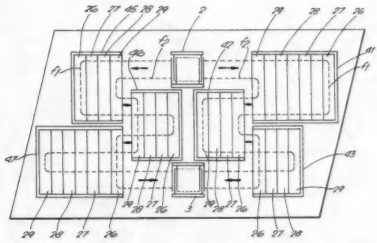
**John Schofield, Coulsdon, England, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jul. 18, 1985, Ser. No. 756,404**

**Claims priority, application United Kingdom, Jul. 25, 1984, 8418978**

**Int. Cl.[4] H03H *9/64, 9/145***

**U.S. Cl. 333—195** **9 Claims**



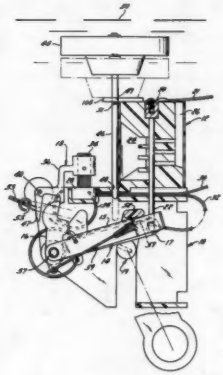
1. A surface-propagating acoustic wave bandpass electrical filter device comprising: a piezoelectric substrate able to propagate acoustic waves at a surface thereof, an input transducer arranged to launch acoustic wave energy along a first propagation track at said surface, an output transducer arranged to receive acoustic wave energy from a second propagation track at said surface which does not overlap said first track, and electrical reflective multistrip coupling means arranged to receive acoustic wave energy correspondingly from the input transducer and to relaunch at least part of that energy as acoustic wave energy back towards the output transducer, said input and output transducers comprising respective interdigital electrode arrays and the reflective multistrip coupling means including a reflective coupler comprising a first and a second array of mutually parallel conducting strips arranged respectively across corresponding input and output propagation tracks, each array including a first set of mutually insulated alternately widely and closely spaced strips, and a second set of electrically interconnected strips arranged so that at least one strip from the second set is situated between substantially every widely spaced pair of strips forming the first set, each strip forming a widely spaced pair in the first set of one array being respectively connected to a corresponding strip forming a closely spaced pair in the first set of the other array, and the second set of strips from both arrays being connected together, characterized in that a corresponding end of the input and output transducers are coupled via a coupling path comprising a plurality of cascaded said reflective couplers, and that for each reflective coupler, the centre-to-centre spacing of the strips is modified in a corresponding manner along the first and the second array such that the input acoustic wave energy contained in successive frequency bands, which are at least contiguous, is correspondingly reflectively transferred to the output track by groups of said strips associated with different amounts of average signal delay, the respective distributions of a signal delay with respect to frequency in the individual reflective couplers being so arranged in the coupling path that the overall propagation delay is substantially the same for all frequencies within the desired passband of the device.

**4,591,816**

## LOW OIL TRIP AND/OR LOCKOUT APPARATUS

**Harvey W. Mikulecky, Oconomowoc, and Todd K. Knapp, Waukesha, both of Wis., assignors to RTE Corporation, Waukesha, Wis.**

**Filed Feb. 7, 1985, Ser. No. 699,423**
**Int. Cl.⁴ H01H** *75/12, 77/00, 9/20*
**U.S. Cl. 335—6** **16 Claims**



1. A low oil responsive lockout apparatus for an under oil primary circuit breaker of the type including an arc extinguishing assembly having an arc chamber with a fixed contact at one end of the chamber and a rod contact movable into engagement with the fixed contact within the arc chamber, a latch mechanism operably connected to move said rod contact between open and closed positions with respect to said fixed contact, a fault current trip assembly for releasing said latch mechanism from said rod contact so that said rod contact will move away from said fixed contact and a crank shaft assembly for manually moving said latch mechanism between open and closed positions, said apparatus comprising a float mounted on said arc extinguishing assembly for movement in response to changes in the level of oil in a transformer and means supported by said float for locking the crank shaft assembly in a fixed position when the oil level drops below a predetermined level with respect to the arc extinguishing assembly.

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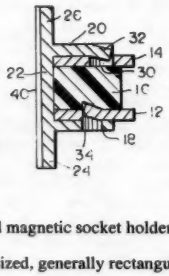
**4,591,817**

## MAGNETIC SOCKET HOLDER

**Merrill R. Miller, Clarinda, Iowa, assignor to Lisle Corporation, Clarinda, Iowa**

**Continuation-in-part of Ser. No. 584,120, Mar. 28, 1984, which is a continuation-in-part of Ser. No. 464,407, Feb. 7, 1983, Pat. No. 4,451,810. This application Feb. 26, 1985, Ser. No. 705,551**
**Int. Cl.⁴ H01F** *7/20*
**U.S. Cl. 335—285** **3 Claims**




1. An improved magnetic socket holder comprising, in combination:

a pair of equal sized, generally rectangular, opposed metallic plates of a magnetizable material forming opposed, spaced pole pieces, each plate including at least one slit in an outside planar surface;

a single magnetic bar having a width dimension no greater than the width of the plates, said bar interposed between the plates and comprised of a flexible material impregnated with a magnetic powder material, the magnetic field of the bar extending from one plate toward the other plate, said bar having a thickness generally corresponding to the distance between the opposed, spaced plates, each of said plates also including at least one projection into the bar to retain the bar in position between the plates; and

a unitary extruded, non-magnetic body for rigidly retaining the plates and bar, said body including opposed parallel, planar spaced sides joined together by a transverse, planar back to form a U shaped cross section slot for receipt and retention of the plates and bar, each one of the planar sides respectively abutted against a pole piece plate and deformed in part into the slit formed in the pole piece to thereby retain the pole piece plates and bar whereby the plates define separate poles for the socket holder.

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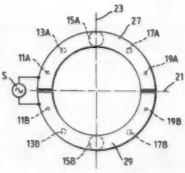
**4,591,818**

## COIL ARRANGEMENT FOR GENERATING A HIGH FREQUENCY MAGNETIC FIELD

**Peter C. Butson, Harrow, England, assignor to Picker International Limited, Middlesex, England**

**Filed Dec. 12, 1984, Ser. No. 680,979**
**Claims priority, application United Kingdom, Dec. 23, 1983, 8334374**
**Int. Cl.⁴ H01F** *5/00*
**U.S. Cl. 335—299** **11 Claims**




1. A coil arrangement for generating a high frequency magnetic field in a generally cylindrical volume comprising: a plurality of conductors extending generally parallel to the axis of the volume and disposed at spaced positions around the volume; and connection means whereby the conductors are connected in electrically parallel paths for energisation from a common source; the self-resonant frequency of each path being high compared with the frequency of said source, and the impedances of the parallel paths differing so that the fields produced by the individual conductors when energised combine to produce a resultant field in the volume of a desired distribution.

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**4,591,819**

## INDUCTANCE ADJUSTMENT FOR TRANSFORMERS

**Leroy W. Nero, Indianapolis, Ind., assignor to RCA Corporation, Princeton, N.J.**

**Filed Mar. 28, 1985, Ser. No. 717,255**
**Int. Cl.⁴ H01F** *17/06, 41/02*
**U.S. Cl. 336—178** **7 Claims**

1. A transformer comprising:

a magnetically permeable core; and

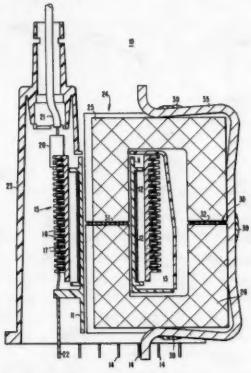
a coil of wire disposed about said core in order to form a transformer winding, said core comprising:

a first core portion;

a second core portion; and

spacing means comprising a length of twisted wire pair

disposed between said first and second core portions to form a gap therebetween, said twisted wire pair being



deformed to provide adjustment of the inductance of said transformer winding.

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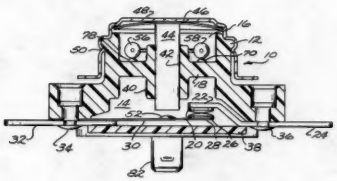
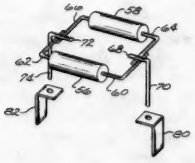
**4,591,820**

## THERMOSTATIC ELECTRIC SWITCH AND THERMAL BIASING ASSEMBLY THEREFOR

**Vicki V. Ruszczyk, and Youn H. Ting, both of Lexington, Ky., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Nov. 13, 1984, Ser. No. 670,182**
**Int. Cl.[4] H01H *61/02, 37/52***
**U.S. Cl. 337—107** **16 Claims**





**1.** In a thermostatic electric switch having a housing formed with a switch chamber, stationary and movable contact means disposed in the chamber, the movable contact means adapted to move into and out of engagement with the stationary contact means terminal means electrically connected to the stationary contact means and the movable contact means to form a circuit, the housing having a recessed end portion, a motion transfer member slidably received in a bore in the housing, the member extending from the movable contact means into the recessed end portion, a thermostatic disc disposed at the recessed end portion, the disc movable on the occurrence of selected thermal conditions between a first dished configuration and a second oppositely dished configuration, the motion of the disc being transferred to the movable contact means through the motion transfer member, a metallic cap member received over the recessed end portion to maintain the disc in its selected location, the improvement comprising a thermal biasing assembly received in the recessed end portion of the housing to modify the effective calibration of the disc, the assembly comprising a pair of generally cylindrical resistors, the resistors having first and second leads extending from opposite ends of the resistors along their longitudinal axis, each of the leads bent approximately 90° at a point intermediate its ends, a pair of elongated connector elements having first and second ends, the distal end of a lead of each resistor electrically connected to the first end of one connector element and the distal end of the other lead of each resistor electrically connected to the first end of the other connector element so that the pair of resistors and their leads form a generally rectangular configuration with the connector depending downwardly generally parallel with one another, the housing formed with a pair of parallely extending bores, additional terminal means, the second end of the connector elements connected to the additional terminal means whereby the effective calibration of the thermostatic disc can be effectively modified by choosing a particular value of resistance for the pair of resistors.

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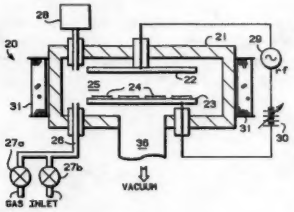
**4,591,821**

## CHROMIUM-SILICON-NITROGEN THIN FILM RESISTOR AND APPARATUS

**Wayne M. Paulson, Paradise Valley, and David W. Hughes, Mesa, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.**

**Division of Ser. No. 466,234, Feb. 14, 1983, Pat. No. 4,510,178, which is a division of Ser. No. 279,130, Jun. 30, 1981, Pat. No. 4,392,992. This application Nov. 19, 1984, Ser. No. 660,602**
**Int. Cl.[4] H01C *1/012***
**U.S. Cl. 338—308** **26 Claims**



**1.** A thin film resistor for impeding the flow of electrical current, comprising:

a substrate for supporting said thin film resistor;

a thin film resistor material region formed on said substrate, said material region comprising a substantially nickel free compound of Cr, Si, and nitrogen, wherein said material region is fomred by reacting Cr and Si with a nitrogen bearing gas and wherein said material region is annealed by heating in a dry ambient atmosphere at a temperature less than 1000° C.; and

conductive contacts formed on said material region to permit electrical connections thereto.

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**4,591,822**

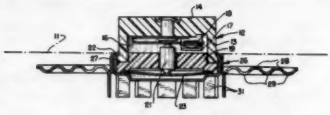
## BIMETAL THERMOSTAT WITH HEAD COLLECTOR

**Douglas P. Versaw, Mansfield, Ohio, and Theo de Geest, Eindhoven, Netherlands, assignors to Therm-O-Disc, Incorporated, Mansfield, Ohio**

**Filed Nov. 30, 1984, Ser. No. 677,026**
**Int. Cl.[4] H01H *37/04, 37/52***
**U.S. Cl. 337—380** **11 Claims**

**1.** A bimetal snap disc thermostat comprising a circular

body, a switch mounted in said body, a circular metallic disc cup mounted on said body, a bimetal snap disc supported at least in part by said disc cup connected to operate said switch upon reaching a predetermined temperature, and a metallic heat collector mounted on the exterior of said disc cup providing a generally planar flange extending therefrom, said heat collector also providing a circular array of projections cut from the material of said flange and extending substantially perpendicular to said flange, said projections substantially increasing the sensitivity of said thermostat to fluid flow in a direction substantially parallel to said flange.



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**4,591,823**

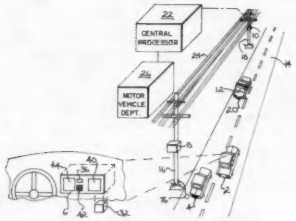
**TRAFFIC SPEED SURVEILLANCE SYSTEM**

**George T. Horvat, 1319 S. 102 St., West Allis, Wis. 53214**

**Filed May 11, 1984, Ser. No. 609,195**

**Int. Cl.[4] B60Q *1/00***

**U.S. Cl. 340—53** **19 Claims**




2. A traffic speed surveillance system comprising:

a set of monitor transceivers located along a roadway and communicating with a central processor, and including at least some stationary transceivers sending radio signals indicative of speed limit in the location of the particular stationary transceiver;

a vehicle transceiver mounted in a vehicle and including:

a vehicle receiver for receiving said radio signals indicative of speed limit;

means for entering driver identification and for entering vehicle identification;

speedometer means for measuring the speed of said vehicle;

comparator means for comparing the measured speed against the speed limit;

a vehicle transmitter responsive to said comparator means for sending radio signals indicative of a given relation between said measured speed and said speed limit and indicative of said driver identification and said vehicle indentification;

said monitor transceivers including monitor receivers for receiving said radio signals from said vehicle transmitter for reporting the given speed relation, driver identification and vehicle identification to said central processor.

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**4,591,824**

**TURNING SIGNAL AND BRAKE LIGHT CONTROL APPARATUS AND METHOD**

**John J. Lomen, 1423 Mapleview, S.E., Kentwood, Mich. 49508**

**Filed Mar. 13, 1985, Ser. No. 711,103**

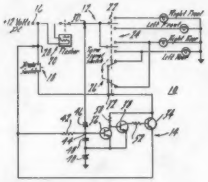
**Int. Cl.[4] B60Q *1/26***

**U.S. Cl. 340—74** **10 Claims**

8. An apparatus for a vehicle having actuatable brakes and a pair of signal lamps comprising:

turn signal switch means being operable to activate only one of said pair of signal lamps to indicate intended direction of turning said vehicle;

means for continuously operating the other of said pair of



signal lamps for a predetermined period upon concurrence of actuation of said brakes and operation of said turn signal switch means despite deactivation of said brakes during said predetermined period.

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**4,591,825**

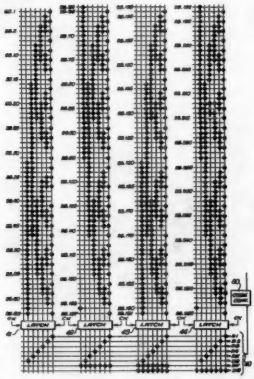
**ANALOG-TO-DIGITAL-CONVERTER AND RELATED ENCODING TECHNIQUE**

**Willard K. Bucklen, San Diego, Calif., assignor to TRW Inc., Redondo Beach, Calif.**

**Filed Aug. 22, 1983, Ser. No. 525,576**

**Int. Cl.[4] H03K *13/175***

**U.S. Cl. 340—347 AD** **13 Claims**



1. For use in an analog-to-digital converter, encoding means comprising:

transition detection means for detecting a transition between binary states in an array of input signals, and producing an array of output signals of which only one has a selected binary state, indicative of the position of the detected transition in the array of input signals; and

binary encoding means coupled to receive the output signals from said transition detection means, for producing a corresponding binary output code having the properties of Gray code in all but its least significant digit and having a least significant digit that alternates in binary state in the manner of standard binary code, whereby errors arising due to multiple indications of transitions in the array of input signals are significantly reduced.

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**4,591,826**

**GRAY CODE DAC LADDER**

**Norman C. Seiler, West Melbourne, Fla., assignor to Harris Corporation, Melbourne, Fla.**

**Filed Jun. 14, 1984, Ser. No. 620,728**

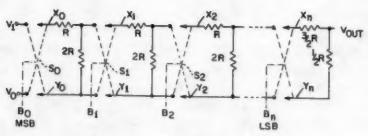
**Int. Cl.[4] H03M *1/66***

**U.S. Cl. 340—347 DA** **8 Claims**

5. A digital to analog converter having a plurality of stages, each stage comprising:

a resistive means having first and second terminals and a third terminal intermediate said first and second terminal;

a switch means responsive to a digital input for connecting said first and second terminals of a stage to either the second and




third terminals respectively or third and second terminals respectively of the preceding stage; and

an output terminal of said converter connecting to the third terminal of the last stage.

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**4,591,827**

**PCM CODER-DECODER**

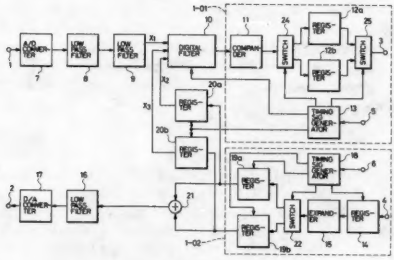
**Shigeo Nishita, Kokubunji; Kazuo Yamakido, Nishitama, and Kenichi Ohwada, Yokosuka, all of Japan, assignors to Hitachi, Ltd. and Hitachi Micro Computer Engineering Ltd., both of Tokyo, Japan**

**Filed Feb. 15, 1985, Ser. No. 702,224**

**Claims priority, application Japan, Feb. 22, 1984, 59-30288**

**Int. Cl.[4] H04M** *3/00*

**U.S. Cl. 340—347 C** **7 Claims**




1. A PCM coder-decoder comprising:

a coder portion including an A/D convertor for converting an analog signal to a digital signal, a first digital filter connected to the output of said A/D convertor, and an output control circuit processing the output of said first digital filter and producing the output as a PCM signal to a transmitter;

a decoder portion including an input control circuit receiving said PCM signal from a transmission line and processing said PCM signal, a second digital filter processing a digital signal received from said input control circuit, and a D/A convertor decoding the output of said second digital filter to the analog signal; and

a plurality of kinds of registers holding respectively a plurality of kinds of signals obtained from said input control circuit;

said first digital filter executing filtration processing of the output of said A/D convertor and addition of the output of a plurality of said registers and the filtered output on the time division basis by means of the signals from said output control circuit.

**4,591,828**

**DIGITAL-TO-ANALOG CONVERTER**

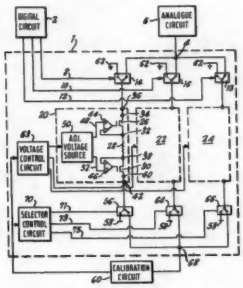
**Michael J. Storey, Cambridge, England, assignor to Cambridge Consultants Limited, England**

**Filed May 6, 1982, Ser. No. 375,558**

**Claims priority, application United Kingdom, May 7, 1981, 8113887; May 7, 1981, 8113888**

**Int. Cl.[4] H03K** *13/02*

**U.S. Cl. 340—347 DA** **4 Claims**




1. A digital-to-analogue converter comprising:

(a) input means for receiving a digital word to be converted to analogue form;

(b) a plurality of weighted analogue signal sources;

(c) first selection means for selecting analogue signals from said sources in accordance with a digital word applied to said input means;

(d) summing means for summing the signals from said selection means to provide an analogue output signal representing said digital word;

(e) means associated with each of a number of said sources for providing a measurable signal representative of the magnitude of the analogue signal thereof independently of selection of said associated source by said first selection means;

(f) second selection means for causing said measurable signal providing means to output said measurable signal, said first selection means and at least one of said sources being operable for providing a weighted analogue signal independently of operation of said second selection means;

(g) a measurement terminal to which said second selection means applies the selected measurable signals; and

(h) a calibration device arranged to operate said second selection means to select a sequence of combinations of said measurable signals which produces at said terminal a sum signal of staircase waveform, to subtract a ramp signal from said staircase waveform signal to produced a signal of sawtooth waveform and to obtain measurement data by measurement of time related to the length of the cycles of said sawtooth waveform.

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**4,591,829**

**RUN LENGTH CODE DECODER**

**Takashi Takeda, Higashi Murayama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 17, 1983, Ser. No. 523,977**

**Claims priority, application Japan, Aug. 26, 1982, 57-146955**

**Int. Cl.[4] H03K** *13/24*

**U.S. Cl. 340—347 DD** **19 Claims**

1. A binary code decoder comprising:

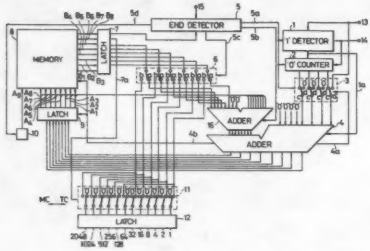
memory means for containing a decode table for decoding a binary code consisting of a plurality of binary signals;

count means for counting one kind of the binary signals;

determining means for determining an address of said memory means to be first accessed in accordance with a count

of said count means and for determining a decode address of the binary code in accordance with data recorded at the first accessed address of said memory means and remaining portions of the binary code not counted by said count means; and

reading means for reading data recorded at the deocde address determined by said determining means.

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**4,591,830**

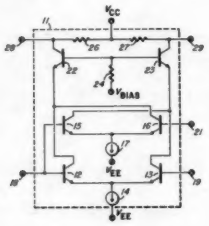
## COMPARATOR CELL FOR ANALOG-TO-DIGITAL FLASH CONVERTER

**John E. Hanna, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Nov. 15, 1984, Ser. No. 671,646**

**Int. Cl.[4] H03K *13/02***

**U.S. Cl. 340—347 AD** **9 Claims**




1. A comparator cell for an analog-to-digital converter comprising:

an even number of level sensors coupled to receive an analog input signal, each one of said level sensors coupled to receive a different reference voltage, said level sensors providing a first and a second current; and

means coupled to said level sensors for providing an output and comprising a first load coupled for receiving said first current and a second load coupled for receiving said second current, said first and second loads having a resistance ratio of $(M-1)/(M+1)$ where M is the number of said level sensors.

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**4,591,831**

## POSITION ANGLE TRANSDUCER FOR TAP CHANGING TRANSFORMERS

**Alexander D'Anci, Springvale, Me., assignor to Intelligent Controls, Inc., Saco, Me.**

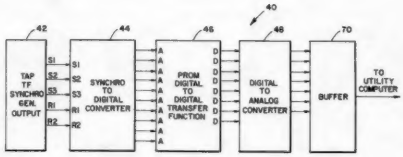
**Filed May 8, 1984, Ser. No. 608,128**

**Int. Cl.[4] G05F *1/153;* H02J *3/12;* H03M *7/28***

**U.S. Cl. 340—347 SY** **23 Claims**

1. An improved position angle transducer for voltage compensating tap changing transformers which have a rotatable shaft for changing the secondary tap of the transformer to different secondary tap positions or tap numbers by rotation of the shaft, a shaft motor for rotating the shaft through different tap changing shaft angles, a shaft angle sensor operatively coupled for generating shaft angle analog signals corresponding to the tap changing shaft angles, wherein each transformer is characterized by a transfer function or functional relationship of tap changing shaft angle to tap number, the improvement comprising:

analog-to-digital converter means having a plurality of inputs operatively coupled to receive the shaft angle analog signals from the shaft angle sensor and a plurality of outputs for delivering digital words, said analog to digital converter means being programmed to deliver shaft angle digital words at the outputs corresponding to the shaft angle analog signals and tap changing shaft angles of the shaft of a tap changing transformer;




computer program means operatively programmed for automatically converting empirically determined transfer function data correlating shaft angle and tap number for a particular tap changing transformer to a digitally encoded table correlating shaft angle and tap number digital words for said tap changing transformer;

digital-to-digital converter means having a plurality of inputs coupled to receive the shaft angle digital words and a plurality of outputs for delivering tap number digital words, said digital-to-digital converter means being operatively programmed with said digitally encoded table for the tap changing transformer for converting the shaft angle digital words to tap number digital words according to the transfer function or functional relationship of tap changing shaft angle to tap number for the particular tap changing transformer.

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**4,591,832**

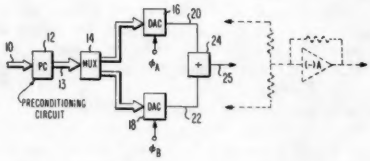
## DIGITAL-TO-ANALOG CONVERSION SYSTEM AS FOR USE IN A DIGITAL TV RECEIVER

**Russell T. Fling, Fishers, and Donald H. Willis, Indianapolis, both of Ind., assignors to RCA Corporation, Princeton, N.J.**

**Filed Jul. 18, 1984, Ser. No. 631,868**

**Int. Cl.[4] H03M *1/12***

**U.S. Cl. 340—347 DA** **20 Claims**




1. A signal processing system for converting digital signal samples, occurring at a prescribed rate, to an analog signal representing the values of said digital samples, comprising:

an input terminal for applying said digital samples;

first and second digital-to-analog converters having respective analog output terminals and respective digital signal input ports;

means coupled to the analog output terminals of said first and second digital-to-analog converters for additively

combining signals provided thereat, to generate an analog output signal from said signal processing systems;

means coupled to said input terminal for preconditioning applied digital input samples according to the function $(1+Z^{-1})^{-1}$ where Z connotes the conventional Z-transform variable; and

means coupled to said signal preconditioning means for alternately applying ones of the preconditioned digital input samples to the input ports of said first and second digital-to-analog converters, wherein said first digital-to-analog converter is conditioned to provide converted samples delayed, by one-half the output analog sample period, from sample conversions provided by said second digital-to-analog converter.

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**4,591,833**

## KEYBOARD UNIT CONTROL SYSTEM USING BLOCK SCANNING TECHNIQUES

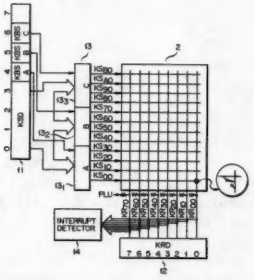
**Takatoshi Ishii, and Osamu Touyama, both of Tokyo, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Aug. 4, 1982, Ser. No. 405,035**

**Claims priority, application Japan, Aug. 13, 1981, 56-125909**

**Int. Cl.⁴ G06F *3/02***

**U.S. Cl. 340—365 S** **4 Claims**



**1.** A keyboard control system for coupling a keyboard unit to a bus of a central processing unit, the central processing unit providing digital data including block selection data and line selection data, said keyboard unit having a matrix of a plurality of row lines and a plurality of column lines, said row lines and said column lines having a plurality of potential crossing positions each of said potential crossing positions corresponding unambiguously to one of a plurality of keys of said keyboard unit and each of said potential crossing positions being convertible to an electrical connection upon choosing one of said keys, said keyboard unit having means for coupling said column lines to said bus, said keyboard control system comprising:

(a) means for latching the data from said bus, said means for latching having inputs adapted to be coupled to said bus and having outputs at which said data are provided;

(b) means for decoding having as inputs the outputs of said means for latching and providing as outputs a plurality of scanning lines divided into blocks, each said scanning line being adapted to couple as an input to one of said row lines, said means for decoding:

(i) in response to data corresponding to said block selection data from said latch means selecting amongst a plurality of blocks of said scanning lines, so as to simultaneously activate all of said scanning lines within a selected block to permit the central processing unit to identify in which block a chosen key is located; and

(ii) in response to data corresponding to said line selection data selecting a single scanning line within a block, to permit the central processing unit to identify the one of said scanning lines to which said chosen key is coupled,

whereby the central processing unit may first send block selection data to identify in which block a key is located, and then send line selection data to determine on which line within the block the key located, the final identification of the key determined by determining the column line on which a signal is returned.

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**4,591,834**

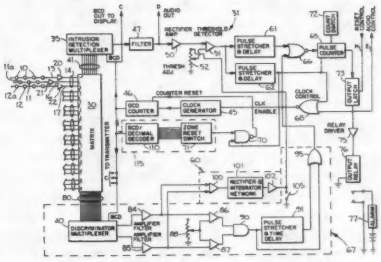
## INTRUSION DETECTING APPARATUS WITH ZONE IDENTIFICATION AND WITH NOISE INTERFERENCE DISCRIMINATION

**William F. Kyle, Los Gatos, Calif., assignor to Argus Systems, Inc., Los Gatos, Calif.**

**Filed Nov. 25, 1983, Ser. No. 555,213**

**Int. Cl.⁴ G08B *13/22***

**U.S. Cl. 340—566** **21 Claims**



**1.** Intrusion detection apparatus comprising:

(a) a plurality of intrusion detection sensors connected to a first signal line;

(b) a plurality of discriminator sensors connected to a second signal line, said first and second signal lines being in the same cable; and

(c) means connected to said intrusion detection sensors and said discriminator sensors and responsive to the activation of any one of said intrusion detection sensors but not more than a predetermined number of said discriminator sensors for operating an alarm.

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**4,591,835**

## REMOTELY ACTIVATABLE ALARM SYSTEM

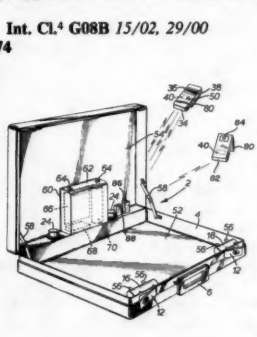
**Graham D. F. Sharp, Sportsmans End, West Malling, Kent, England**

**Filed Mar. 22, 1984, Ser. No. 592,369**

**Claims priority, application United Kingdom, Mar. 25, 1983, 8308228**

**Int. Cl.⁴ G08B *15/02, 29/00***

**U.S. Cl. 340—574** **9 Claims**



**1.** A remotely activatable alarm system comprising a porta-

ble security container, a handle for carrying the security container, at least one manually operable lock for locking and unlocking the security container, at least one smoke outlet provided in a bottom wall of the security container, at least one sound outlet provided in the bottom wall of the security container, a smoke emitting device which is positioned in the security container and which is for provided a visual warning of an attempted theft and for staining the contents of the security container, an audio alarm means which is positioned in the security container and which is for providing an audible warning of the attempted theft, receiver means which is positioned in the security container and which is for activating the smoke emitting device and the audio alarm means consequent upon receiving a transmitted signal, and transmitter means for transmitting the transmitted signal to the receiver means from a position remote from the security container, the receiver means and the transmitter means each being provided with an encoding device whereby the receiver means and the transmitter means are signal encodable for operation on a pre-programmed signal frequency, the security container being such that the manually operable lock for locking and unlocking the security container operates independently of the transmitter means whereby valuables to be placed in and removed from the security container can be under the control of financial personnel who have no control over the transmitter means, and whereby the entire security container can be under the control of security personnel who have no control over the manually operable lock and thus over the valuables in the security container, and the smoke and sound outlets being not noticeable as the security container is carried by the handle in an upright position whereby a would-be thief is not prematurely alerted to the presence of the smoke emitting device and the audio alarm means in the security container and is thus not provoked into violent action whilst the security container is still being held by an authorised holder of the security container.

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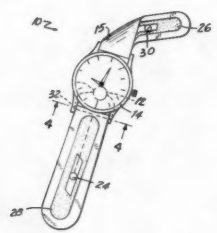
**4,591,836**

## BATTERY OPERATED PANIC ALARM WRIST WATCH

**Nathan Feigenblatt, Jr., and George Spector, both of 233 Broadway, RM 3615, New York, N.Y. 10007**

**Filed Jan. 16, 1985, Ser. No. 692,343**
**Int. Cl.[4] G08B *13/00***
**U.S. Cl. 340—574** **5 Claims**



**1.** A wrist watch alarm, comprising:

(a) a watch having a band;

(b) means for producing an audio signal and being disposed in said watch;

(c) means for powering said audio signal producing means and being disposed in said band;

(d) means for applying said powering means and being disposed in said band; and

(e) means for keeping said band closed on the user and being disposed on said band so that when said band closing means is opened, said power applying means permits said audio signal producing means to produce an audio signal and when said band closing means is closed said power applying means prevents said audio signal producing means from producing an audio signal.

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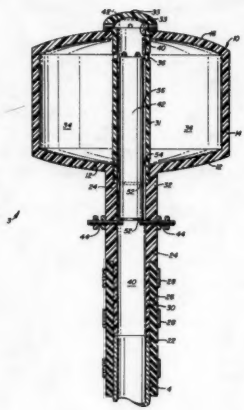
**4,591,837**

## HYDRAULIC FLUID LEAK WARNING APPARATUS

**Donald G. Martinez, P.O. Box 584, Calistoga, Calif. 94515**

**Continuation-in-part of Ser. No. 420,067, Sep. 20, 1982, abandoned. This application Nov. 14, 1984, Ser. No. 671,266**
**Int. Cl.[4] G08B *21/00***
**U.S. Cl. 340—605** **15 Claims**



**1.** A hydraulic fluid leak detector for use with hydraulically powered equipment having a hydraulic fluid reservoir, comprising:

a housing, defining an expansion chamber therein, mounted above the fluid reservoir, said expansion chamber having a bottom;

a float chamber, fluidly connected to and between the expansion chamber and the fluid reservoir and extending above the expansion chamber bottom, the float chamber fluidly coupled to said expansion chamber through an overflow opening positioned above the expansion chamber bottom so excess hydraulic fluid which expands upon beginning operation of the equipment flows from the fluid reservoir, through the float chamber, through the overflow opening and into the expansion chamber where it is temporarily contained;

means for signalling when the fluid in said float chamber is below a predetermined level; and

means for selectively draining hydraulic fluid from a lower region of said expansion chamber into the reservoir, the hydraulic fluid in said expansion chamber remaining therein until said selectively draining means is actuated.

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**4,591,838**

## SPILLAGE DETECTOR FOR LIQUID CHROMATOGRAPHY SYSTEMS

**Michael R. Jarvis, Champaign, and Donald S. Fulton, St. Joseph, both of Ill., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Mar. 23, 1983, Ser. No. 478,129**
**Int. Cl.[4] G08B *21/00***
**U.S. Cl. 340—605** **10 Claims**

**1.** A spillage detector device for use in conjunction with fractionation in liquid chromatography systems, said device comprising:

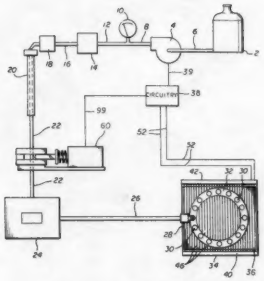
a spillage receiving means beneath said fractionation for collecting said spillage;

sensor means including a plurality of electrodes of alternating polarity mounted within said receiving means, said electrodes being conductive in the presence of said spillage;

detection circuit means operatively connected to said sensor means, said detection circuit means being responsive to conductivity between said electrodes of alternating polarity;

pliable circuit means for containing the liquid flow within said liquid chromatography system;

electrically actuated solenoid means for on/off control of liquid flow through said liquid chromatography system, said solenoid means including a support structure and a



rod, said support structure including a passageway permitting said pliable conduit to pass therethrough, said rod being pivotally mounted to said support structure and said plunger, said rod being positioned so as to provide compressive closure of said pliable conduit upon motion of said plunger;

output circuitry means operatively connected to said detection circuit means and said solenoid means for deactuating said solenoid means and thus halting liquid flow in response to the presence of liquid spillage about said spillage receiving means; and

power means for providing electrical current for powering said sensor means, said detection circuit means, said solenoid means, and said output circuitry means.

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**4,591,839**

## SYSTEM FOR DETECTING LOW LIQUID LEVEL AND PROBE THEREFOR

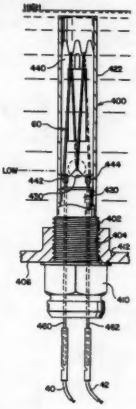
**Ben J. Charboneau, Wixom, and Richard D. Zerod, Union Lake, both of Mich., assignors to Gulf & Western Manufacturing Company, Southfield, Mich.**

**Division of Ser. No. 380,429, May 20, 1982, Pat. No. 4,506,258. This application Dec. 5, 1984, Ser. No. 678,589**

**Int. Cl.[4] G08B *21/00***

**U.S. Cl. 340—620** **2 Claims**

1. A probe for use in a system of the type that actuates a warning device when the level of a liquid in a receptacle is below a preselected level, said probe comprised of: a base portion having means for mounting said probe with respect to said receptacle; an elongated frame extending from said base portion having spaced wire engaging portions at the ends thereof; a length of positive temperature coefficient wire having properties wherein the resistance across said wire increases with increased wire temperature, said wire being wound about the axial ends of said elongated frame to form convolutions about said frame, said convolutions having elongated, generally parallel portions of said wire extending axially along said frame; and shielding means radially surrounding and spaced from said elongated, generally parallel portions of said wire, said shield having apertures therein located generally adjacent the ends of said frame to allow flow of said liquid through said



sleeve to effect quiescent engagement of said liquid with said wire when said probe is vertically positioned in said receptacle.

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**4,591,840**

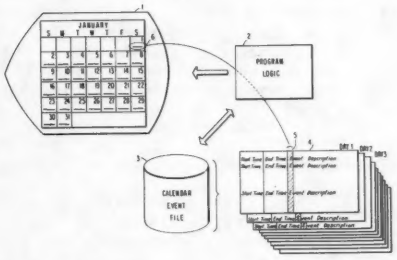
## CALENDAR EVENT DESCRIPTION ABBREVIATION

**Donald E. Curtis, Garland; James P. Vincent, Arlington, and Mary E. Weidmann, Irving, all of Tex., assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Nov. 4, 1983, Ser. No. 548,608**

**Int. Cl.[4] G09G *3/04***

**U.S. Cl. 340—706** **6 Claims**




1. A method of building a readily interpretable monthly calendar, said method comprising:

(a) keying time related event descriptions for building daily screens;

(b) building a monthly calendar with days of a month indicated thereon;

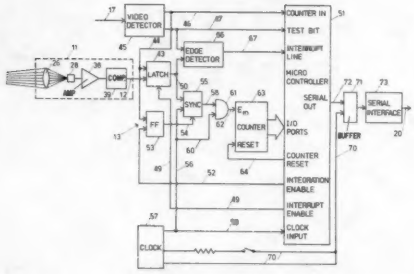
(c) locating the first character of an event description for a day from a daily screen; and

(d) positioning said first character time-wise relative to a day indication on said monthly calendar.

## 4,591,841
## LONG RANGE OPTICAL POINTING FOR VIDEO SCREENS

**Jon Gunderson; David P. Kelso, and Gregg Vanderheiden, all of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Filed Nov. 1, 1983, Ser. No. 547,869**
**Int. Cl.[4] G09G *1/16***
**U.S. Cl. 340—707** **23 Claims**
**MICROFICHE APPENDIX INCLUDED**
**(1 Microfiche, 20 Pages)**




1. Apparatus for use in locating a spot on a video screen which is scanned in a raster, comprising:

(a) an optical pointer including a photodetector responsive to light, a lens for focusing a portion of the image of a plurality of raster lines from the screen on the photodetector, and detection means responsive to the photodetector for providing an output signal pulse corresponding to the incidence of light from a raster line on the photodetector;

(b) signal processing means, responsive to the detected raster line output signal from the optical pointer and to the vertical and horizontal video signals controlling the display on the video screen for a frame of raster lines, for determining an averaged vertical and horizontal position with respect to the screen of the video image of a plurality of the detected raster lines incident on the photodetector during a frame of raster lines and providing an output signal indicative thereof.

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## 4,591,842
## APPARATUS FOR CONTROLLING THE BACKGROUND AND FOREGROUND COLORS DISPLAYED BY RASTER GRAPHIC SYSTEM

**Charles J. Clarke, Jr., Phoenix, and Kevin P. Staggs, Glendale, both of Ariz., assignors to Honeywell Inc., Phoenix, Ariz.**

**Filed May 26, 1983, Ser. No. 498,361**
**Int. Cl.[4] G09G *1/16***
**U.S. Cl. 340—723** **3 Claims**

1. Apparatus for controlling the colors displayed by a raster graphic system comprising:

PIXEL clock means for producing PIXEL clock pulses, one clock pulse as each PIXEL is scanned;

raster scan logic means for producing the address of each PIXEL as scanned;

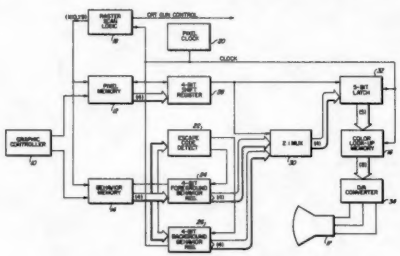
random access memory means to which the addresses of PIXELS produced by the raster scan logic means are applied for producing during each memory read cycle "n" control bits and a set of behavior bits stored at the addressed memory location, the address of the addressed memory location being that of the first of a set of "n" adjacent PIXELS of a given horizontal scan line, a memory read cycle occurring every "n"th clock pulse, where "n" is an integer greater than one;

shift register means into which are loaded the "n" control bits read out of the memory each memory read cycle, said shift register means producing one control bit for each clock pulse produced by the PIXEL clock;

first behavior register means and second behavior register means for storing the behavior bits produced by the memory each memory read cycle;

detection means for examining each set of behavior bits produced during each memory read cycle to detect a predetermined set of behavior bits;

means responsive to said detection means failing to detect that a set of behavior bits examined is said predetermined set for enabling the first behavior register means to store that set of behavior bits, said means responsive to said




detection means detecting that a set of behavior bits examined is said predetermined set for inhibiting both behavior register means from storing said predetermined set of behavior bits and for enabling the second behavior register means to store the set of behavior bits produced by the memory means during the next memory read cycle; and

circuit means responsive to each control bit produced by the shift register means for selecting the behavior bits stored in either the first or the second behavior register means, said control bit and the set of behavior bits from the selected behavior register means forming an address to a color control memory.

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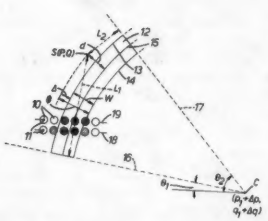
## 4,591,843
## DIGITAL DISPLAY SYSTEM

**John M. Pratt, Macclesfield, England, assignor to International Computers Limited, London, England**

**Filed Jun. 30, 1983, Ser. No. 509,366**
**Claims priority, application United Kingdom, Jul. 8, 1982, 8219823**
**Int. Cl.[4] G09G *1/06***
**U.S. Cl. 340—728** **7 Claims**



1. A method of displaying an arc of a circle on a display device element being capable of being displayed with a selected one from more which produces an image as an array of picture elements, each picture than two possible intensities, the method comprising:

A. scanning the picture elements along a plurality of scan lines crossing the arc, and for each scan line performing the steps:

(a) for an initial picture element of the scan line deriving an

indication of a closest distance from a sampling point corresponding to the element to an ideal circle characterising the arc,

(b) for each subsequent picture element of the scan line, deriving an indication of a closest distance from a sampling point corresponding to the element to the said ideal circle by incrementing or decrementing the closest distance indication derived for the preceding picture element by adding or subtracting a change indication,

(c) for each said subsequent picture element, incrementing or decrementing said change indication by addition or subtraction of an amount proportional to the inverse of the radius of the ideal circle, and

(d) for each picture element of the scan line, deriving from at least the closest distance indication for that element an indication of an intensity for the picture element; and

B. controlling the display device so that picture elements included in the said scan lines are displayed with the indicated intensity.

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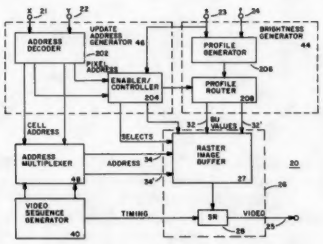
**4,591,844**

## LINE SMOOTHING FOR A RASTER DISPLAY

**Charles W. R. Hickin, Binghamton, and Michael D. Austen, Johnson City, both of N.Y., assignors to General Electric Company**

**Filed Dec. 27, 1982, Ser. No. 453,464**
**Int. Cl.[4] G09G *1/06***
**U.S. Cl. 340—728** **12 Claims**




1. A display system for smoothing out stair-step effects in the raster display of information having line segments, said display system comprising:

a raster scanned display including a surface having a plurality of pixels for displaying information to a viewer; and

a display generator for generating video signals to control said display in displaying line segments, said display generator including:

(a) a brightness generator responsive to input signals for dividing each line segment to be displayed into a plurality of sections each made up of one or more pixels and for determining individual brightness values of said pixels in proportion to the amount of surface area of those of said pixels in each section overlaid by said line segment to be displayed,

(b) a memory,

(c) means responsive to pixel address signals for addressing said memory to store said pixel brightness values in memory locations associated with each said pixel of each section, and

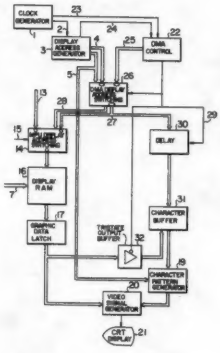
(d) a video sequence generator for addressing said memory in a predetermined sequence to retrieve said pixel brightness values pursuant to the generation of said video signals to said raster display.

**4,591,845**

## CHARACTER AND GRAPHIC SIGNAL GENERATING APPARATUS

**Shigeru Komatsu, and Shigeru Hirahata, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Sep. 22, 1983, Ser. No. 534,684**
**Claims priority, application Japan, Sep. 29, 1982, 57-168331**
**Int. Cl.[4] G09G *1/16***
**U.S. Cl. 340—745** **2 Claims**




1. A signal generating apparatus for displaying character and graphic data comprising:

display memory means for storing coded character and graphic data corresponding to at least one display frame;

frame buffer means for storing coded character data corresponding to one display frame of said character and graphic data;

means for DMA transferring said coded character data from said display memory means to said frame buffer means in a non-display period;

graphic data fetching means for fetching graphic data in said character and graphic data from said display memory means in a display period;

coded data decoding means for fetching said coded character data from said frame buffer means and for decoding the same into pattern data in a display period; and

composite video signal generating means for combining the output signals from said graphic data fetching means and said coded data decoding means and for generating a composite video signal for displaying said character data.

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**4,591,846**

## REAL TIME CELL SPECIFICATION PROCESSOR

**William M. Koos, Jr.; Timothy R. Geis, both of Orlando, and Richard M. Rudy, Jr., Longwood, all of Fla., assignors to Burroughs Corp., Detroit, Mich.**

**Filed Sep. 28, 1982, Ser. No. 425,211**
**Int. Cl.[4] G09G *1/16***
**U.S. Cl. 340—748** **7 Claims**

1.

A real time processor which generates the pixel data necessary to print character fonts and logos, having an initial processor which translates information from a host into a string of cell specifications placed in order of scan line of first appearance, said cell specifications having horizontal location, cell height, font memory bank address, cell width and font memory address identifiers, said real time processor generating pixel data on a scan line-by-scan line basis, comprising:

a memory means for storing said string of cell specifications produced by said initial processor;

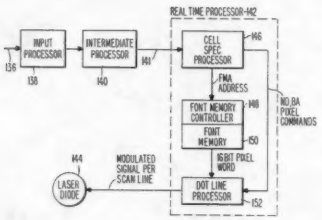
an input latching means, connected to said memory means,

for latching a particular cell specification while it is being processed for the current scan line;

a command generating and recycling means, connected to said input latching means, for processing the latched cell specification and for generating pixel word commands for each pixel word comprised of pixel bits used to compose said current scan line, each of said pixel word commands indicating the font memory address, the number of pixel bits required by the latched cell specification, and the location along the scan line for each of said pixel words;

a cell specification reconstituting means connected to said input latching means, for decreasing the cell height indicator by one, and for testing to determine if said latched cell specification remains active on the next scan line;

a recirculating latch means, connected to said cell specification reconstituting means, said input latching means, and




said command generation and recycling means for reconstructing a modified cell specification to be recirculated back to said memory means after said command generation and recycling means has completed processing said latched cell specification for said current scan line;

a font memory means to receive said pixel word commands from said command generation and recycling means for retrieving said pixel words comprised of pixel bits needed to compose the character font or logo represented by said latched cell specification; and,

a dot line processing means to receive said pixel word command from said command generating and recycling means and said pixel words comprised of pixel bits from said font memory means, for assembling a complete scan line of pixel data, said completed scan line of pixel data to be released to modulate a printer after all the cell specifications active on said current scan line have been processed.

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**4,591,847**

## METHOD AND APPARATUS FOR GAS DISPLAY PANEL

**Tony N. Criscimagna, Woodstock, and Albert O. Piston, Catskill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 268,219, Jun. 23, 1972, abandoned, which is a continuation of Ser. No. 885,086, Dec. 15, 1969, abandoned. This application Jun. 21, 1973, Ser. No. 372,384**

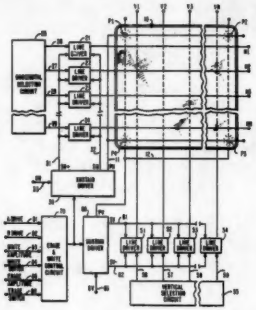
**Int. Cl.[4] G09F 9/00**

**U.S. Cl. 340—776** **82 Claims**

1. A method for writing and sustaining the gas cells of a gas panel which has a gas filled means with a plurality of horizontal lines disposed on one side and a plurality of vertical lines disposed on the opposite side, the vertical lines being orthogonal with respect to the horizontal lines, and the coordinate intersections of the horizontal lines and the vertical lines defining gas cells, the method including the steps of:

performing sustain operations by applying across all gas cells a potential difference in the form of a square wave train having positive and negative excursions each of which exceed the sustain level of the gas cells, and

writing in a selected gas cell by decreasing the frequency of the square wave train and increasing the magnitude of the



potential difference across a selected gas cell, and only the selected gas cell, above the ignition level of the gas.

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**4,591,848**

## MATRIX PANEL WITH AN ACTIVE DRIVING SYSTEM

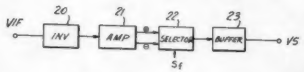
**Shinji Morozumi; Toshiyuki Misawa, and Yoshio Nakazawa, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan**

**Filed Mar. 31, 1983, Ser. No. 481,049**

**Claims priority, application Japan, Apr. 1, 1982, 57-54339; Apr. 6, 1982, 57-56945**

**Int. Cl.[4] G09G 3/36**

**U.S. Cl. 340—784** **19 Claims**




1. An active driving system for a liquid crystal matrix panel, having a plurality of cells each including a transistor for switching the cell on and off during selected and non-selected periods respectively and a picture element, said matrix panel receiving an external vidoe signal adapted to a cathode ray tube display and a frame signal, the active driving system comprising: inverter means for inverting the polarity of the external video signal; scaling means coupled to the inverter means for symmetrically amplifying the inverted video signal to produce two negative-video signals having bias voltages and amplitudes which are symmetrical to a common voltage level; and selector means coupled to the scaling means for producing a composite negative-video signal by alternating selecting the two negative-video signals.

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**4,591,849**

## LIQUID CRYSTAL DISPLAYS

**Anthony J. Hughes, Malvern; Frances C. Saunders, Malvern Wells, and Ian A. Shanks, Bedford, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**

**Filed Feb. 10, 1983, Ser. No. 465,546**

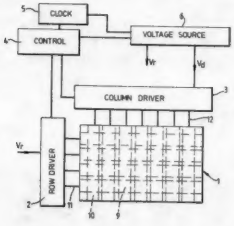
**Claims priority, application United Kingdom, Feb. 19, 1982, 8204892**

**Int. Cl.[4] G09G 3/36**

**U.S. Cl. 340—784** **7 Claims**

2. A liquid crystal display comprising a liquid crystal cell formed by enclosing a thin layer of a cholesteric liquid crystal material between two slides each bearing an electrode structure set arranged to provide a plurality of overlapping elec-

trode intersection forming elements, drive electronics for selectively applying voltages to each electrode set such that voltages are applied to the electrodes in each set in sequence causing selected elements to change between an OFF state and an ON state to collectively display information, a variable voltage source for supplying voltages to the drive electronics, and control logic for controlling the drive electronics to give




an R.M.S. voltage $V_x$ at elements required to be at an OFF state and an R.M.S. voltage $V_c$ higher than $V_x$ at elements required to be at an ON state, and for controlling the voltage source to reduce its voltage output to both OFF and ON elements simultaneously while maintaining the ratio of $V_x$ and $V_c$ for a period while information displayed is to be changed, said period being not less than a time taken to address elements to be changed and less than 30 milliseconds.

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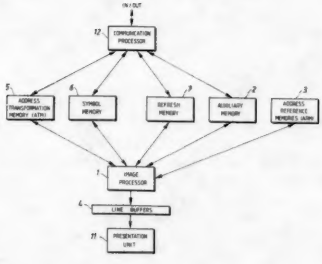
**4,591,850**

## AUXILIARY MEMORY IN A VIDEO DISPLAY UNIT OF THE RASTER SCAN TYPE

**Jan-Erik Lundström, Västerås, Sweden, assignor to ASEA Aktiebolag, Västerås, Sweden**

**Filed Jun. 10, 1983, Ser. No. 503,114**
**Claims priority, application Sweden, Jun. 24, 1982, 8203946**
**Int. Cl.⁴ G09G *1/00***
**U.S. Cl. 340—799** **6 Claims**




1. A device for presenting graphical information in the form of dot matrix symbols of arbitrary shape and size on a presentation unit of the raster scan type, comprising,

a symbol memory, in which information about the dot patterns of the available symbols is stored, and

a refresh memory, in which information is stored about the position of the symbols included in an image,

characterized in that the devices also comprises,

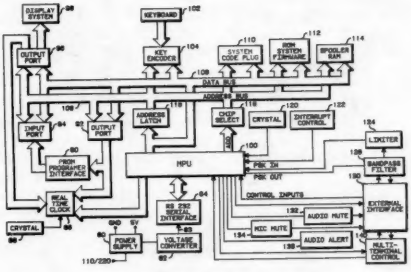
an auxiliary memory, storing for each symbol occurring on the image, information about the position in the image, including a start element for presentation of the symbol, the start element being that element of the symbol which is first written during presentation, and a definition element identifying a position in the refresh memory, which corresponds to the position of the definition element in the image, at which position of the refresh memory there is stored a code which identifies the symbol.

**4,591,851**

## GENERAL PURPOSE DATA CONTROL SYSTEM

**Scott W. Noble, Bedford; Timothy M. Burke, Fort Worth, and Charles N. Lynk, Jr., Bedford, all of Tex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 402,689, Jul. 28, 1982, abandoned. This application Jan. 28, 1985, Ser. No. 695,748**
**Int. Cl.⁴ H04Q *9/00*; H04B *7/00***
**U.S. Cl. 340—825.07** **9 Claims**




1. A communication system adapted for voice and data communications over a communication medium, comprising at least one primary station and a plurality of remote stations, each remote station having a predetermined station address stored in a station address register, and adapted to transceive data signals consisting of at least a bit synchronization portion, a synchronization word, and a command data packet of fixed length, said system comprising:

at least one primary station and a plurality of remote stations each having,

means for transmitting a data signal consisting of at least a bit synchronization portion, a synchronization word, and a command data packet of fixed length; in response to an activation signal;

means for receiving a data signal, including first and second synchronization means for synchronizing to said bit synchronization portion and said synchronization word respectively, and further including means for generating said activation signal in response to said command data packet;

means for generating said activation signal in response to initiating a voice transmission.

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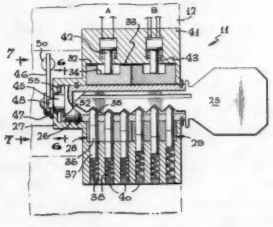
**4,591,852**

## RECORDING LOCK SYSTEM

**Meyer C. Brod, 5349 Newcastle Ave., Encino, Calif. 91316**

**Filed Apr. 30, 1984, Ser. No. 605,258**
**Int. Cl.⁴ H04Q *9/00*; E05B *49/00***
**U.S. Cl. 340—825.31** **1 Claim**



1. An automatic system for identifying an authorized key utilized to lock and unlock a bolted door lock and to record

pertinent data attendant thereto on a printed sheet, the combination which comprises:

an authorized key of a given weight having coded notches along an edge;

a door lock;

a key sensing mechanism carried on said door lock responsive to said authorized key coded notches for actuating said door lock;

a switch circuit operable in response to said key sensing mechanism and said door lock actuation to generate key transaction signals;

said door lock and said switch circuit operating simultaneously in response to said key sensing mechanism;

control circuit means coupled to said switch circuit for receiving said key transaction signals and for producing time and date signals associated with said key transaction signals.

printer means operatively connected to said control circuit for receiving said key transaction signals and said time and date signals for recording onto said printed sheet;

said key sensing mechanism includes a body having a concentric inner cylinder with a plurality of coaxial cylindrical sleeves arranged adjacent to one another about said inner cylinder;

pin means resiliently mounted to move between said body, said sleeves and said inner cylinder for selectively connecting certain ones of said sleeves to said inner cylinder and certain ones of said sleeves to said body in response to a particular one of said authorized keys whereby said certain ones of said sleeves connected to said inner cylinder rotate and said sleeves connected to said body remain stationary;

said key sensing mechanism further includes fixed electrical contacts on said body matable with movable electrical contacts on said inner cylinder for generating lock and unlock signals to said printer via said control circuit; and

each of said key sensing mechanism sleeves includes a recess occupied by a resiliently biased contact movable in response to movement of connected ones of said sleeve with said inner cylinder to initiate said key transaction signals.

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**4,591,853**

## PAGING RECEIVER WITH A DECODER-P-ROM

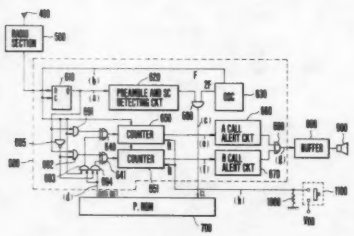
**Toshihiro Mori, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan**

**Filed Nov. 10, 1982, Ser. No. 440,724**

**Claims priority, application Japan, Nov. 16, 1981, 56-183373**

**Int. Cl.[4] H04Q** *9/00;* **H04B** *1/16;* **G08B** *7/00*

**U.S. Cl. 340—825.44** **4 Claims**




1. A paging receiver comprising:

a programmable read only memory (P-ROM) for storing bit information which is stored with N, N being an integer greater than 1, kinds of information and having a built-in decoder;

means for sequentially reading out the contents stored in said P-ROM in response to a clock frequency which is N times or more the frequency of a clock corresponding to the bit rate of a received signal; and

means for effecting substantially simultaneous comparison of the read out N kinds of stored contents with the received signal to determine whether the received signal is a paging signal assigned to said paging receiver.

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**4,591,854**

## TOUCH CONTROL IDENTIFICATION SYSTEM WITH PORTABLE ENCODER

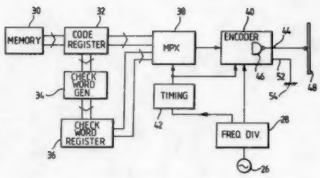
**Alan W. Robinson, Northumberland, England, assignor to Roundel Electronics Limited, Tyne & Wear, England**

**Filed Oct. 12, 1983, Ser. No. 541,162**

**Claims priority, application United Kingdom, Oct. 12, 1982, 8229095**

**Int. Cl.[4] H04Q** *1/00*

**U.S. Cl. 340—825.31** **18 Claims**




1. A security system for confining the use of equipment to an authorised user or users, wherein the system comprises:

(i) at least one portable device to be worn or carried by a respective authorised user, the device having means for storing a respective unique digital identification code, means for transmitting the code in a predetermined format, and, coupled to an output of said transmitting means, an exposed conductive portion arranged, when in use, to be in contact with the user's skin; and

(ii) a control unit to be coupled to the said equipment, the unit comprising means, having an electrical contact surface for receiving the transmitted code when the user touches said contact surface, means for comparing the code with an internally stored access code, and means for enabling said equipment only when said comparing means detects a match between the transmitted code and the access code.

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**4,591,855**

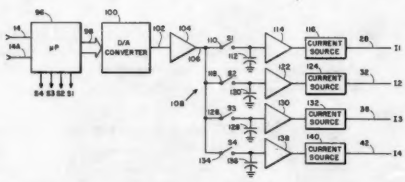
## APPARATUS FOR CONTROLLING A PLURALITY OF CURRENT SOURCES

**Tom L. Blackburn, San Jose, Calif., assignor to GTE Communication Products Corporation, Phoenix, Ariz.**

**Filed Dec. 27, 1983, Ser. No. 565,568**

**Int. Cl.[4] G08C** *15/08*

**U.S. Cl. 340—870.13** **1 Claim**




1. Apparatus for controlling the magnitude of output current flowing in each of a plurality of current sources, which comprises:

sensor means providing status signals indicative of at least one parameter being sensed;

microprocessor means coupled to said sensor means and responsive to said status signals for generating at a first

output a plurality of binary codes corresponding to said plurality of current sources, respectively, each code representing an amplitude that is defined by at least one of said status signals, and for generating at a plurality of second outputs a plurality of timing signals;

digital-to-analog converter means coupled to said first output for converting said plurality of binary codes to an equal number of analog signals;

buffer amplifier means for buffering said analog signals;

sample and hold means having common inputs coupled to said buffer amplifier means for selectively transferring, in response to said timing signals, said analog signals to each of said plurality of current sources, said analog signals controlling the output current from said plurality of current sources;

said plurality of second outputs selectively coupled to ones of said sample and hold means for controlling the proper timing sequence thereof.

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**4,591,856**

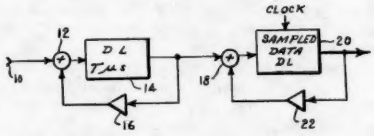
## HAND OFF INTEGRATOR APPARATUS FOR SIGNAL DETECTION

**Raymond J. Masak, East Northport, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Dec. 8, 1983, Ser. No. 559,168**

**Int. Cl.[4] G01S *7/28;* G06G *7/18;* H03K *5/159***

**U.S. Cl. 343—17.1 R** **4 Claims**




1. A hand off integrator apparatus for signal detection comprising in combination:

a first means for integrating an input signal, said first integrating means receiving a series of input pulses as input signal, said first integrating means providing an output pulse signal for each of a predetermined number of said series of input pulses, said predetermined number for said series of input pulses is twenty, and,

a second means for integrating a pulse signal, said second integrating means operating at a predetermined sample rate, said second integrating means receiving said output pulse signal from said first integrating means, said second integrating means integrating said output pulse signal to provide an output integration signal which is proportioned to the data received during said predetermined sample rate, said first and second integrating means each respectively comprise a recirculating integrator means, said second integrating means receives a clock signal which sets said predetermined sample rate, said predetermined sample rate being equal to the number of samples integrated in said first integrating means.

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**4,591,857**

## PROGRAMMABLE LFM SIGNAL PROCESSOR

**Robert C. Thor, Liverpool, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Jul. 11, 1983, Ser. No. 512,848**

**Int. Cl.[4] G01S *13/28***

**U.S. Cl. 343—17.2 PC** **7 Claims**

1. A signal processor for a linear frequency modulation (LFM) pulse compression system with digital processing at baseband using in-phase (I) and quadrature (Q) channels, in which the slope of the LFM processor (up or down ramp) is selectively controlled by either complementing or not complementing the Q channel, the signal processor being programmed to match the LFM slope of a desired signal;

a sidelobe filter with inputs from the I and Q channels;

an input tapped delay line with inputs from the sidelobe filter, having (M−1) multiplied by S sample delays tapped every S samples, S being selected from the values 1 and 2, the input tapped delay line having programmable tap spacing to allow changing the pulse compression ratio;

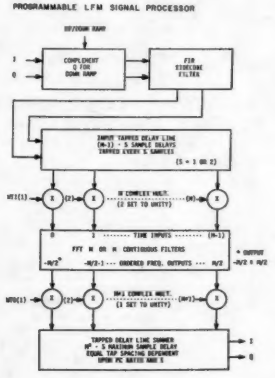
a filter bank of the fast Fourier transform (FFT) type, a first set of M complex multipliers coupled between said input tapped delay line and the filter bank, in which complex weights used remove the parabolic phase from the portion of the signal contained within the input tapped delay line, the complex weights being a function of an integer value $K_o$ derived from a desired pulse compression (PC) ratio K and forming an even symmetrical function across the input taps;

the complex phase weights WTIph(I) for said first set of complex multipliers for values of I from 1 to M inclusive being

$$WTIph(I)=[A(I)^2-0.25]\pi/K_o \text{ (radians)}$$

where $A(I)=I-0.5*(M-1)$,

the complex amplitude weights WTIamp(I) for said first set




of complex multipliers for values of I from 1 to M inclusive being determined as follows:

$$L=\text{Int}[(M^2)/K_o]*K_o/M$$

if $L<|A(I)|$ WTIamp(I)=0

if $L=|A(I)|$ WTIamp(I)=0.5

if $L>|A(I)|$ WTIamp(I)=1.0

wherein the filter bank includes means for ordering its outputs in increasing frequency about a D.C. term, with the highest frequency term (M/2) being used at both ends of the frequency range forming M+1 outputs, the amplitude weights used on these two edge outputs being modified by one-half to compensate for its double use;

a long tapped delay line, a second set of complex multipliers coupled between the outputs of said filter bank and inputs of the long tapped delay line, the phase shift corresponding to the output complex weights being a function of the value $K_o$ arising when $K_o$ is less than the value M squared, the amplitude portion of the output complex weights being a function of the PC ratio K and the one-half factor used in the two-edge filter bank outputs, the outputs of the second set of complex multipliers being summed in the long tapped delay line summer, the delay line taps between summing being equal as determined by the values $K_o$ and the filter bank size M;

the complex phase weights WTOph(I) for said second set of complex multipliers for values of I from 1 to M+1 inclusive being

$$WTOph(I)=[P*C(I)+P_m]*C(I) \text{ (radians)}$$

where

$P=\pi*K_o/(M^2)$

$P_m=\pi(M-1)/M$

$C(I)=I-1-M/2$,

the complex amplitude weights WTOamp(I) for said second set of complex multipliers for values of I from 1 to M+1 inclusive being determined as follows:

$$A_m=M*K/K_0)^{\frac{1}{2}}$$

$$N=\text{Int}[A_m-1)/2]*2+1$$

$$W=(A_m-N)/2$$

$$D_m=1+N/2$$

if $|C(I)|<D_m$ WTOamp(I)=0
if $|C(I)|=D_m$ WTOamp(I)=W
if $|C(I)|>D_m$ WTOamp(I)=1.0

and wherein the long tapped delay line summer tap spacing $T_s$ is:

$$T_s=K_o*S/M.$$

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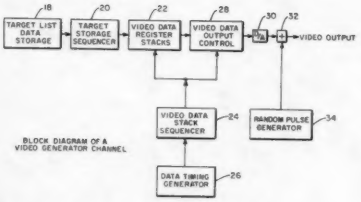
**4,591,858**

## BEACON/RADAR VIDEO GENERATOR SYSTEM FOR AIR TRAFFIC SIMULATION

**Stephen R. Jacobson, Arlington, Va., assignor to The Mitre Corporation, Bedford, Mass.**

**Filed Dec. 3, 1982, Ser. No. 446,852**
**Int. Cl.[4] G01S 7/40**
**U.S. Cl. 343—17.7** **19 Claims**




BLOCK DIAGRAM OF A VIDEO GENERATOR CHANNEL

1. An air traffic video simulator for producing a video signal output with simulated targets, comprising:

clock means for generating an azimuth signal indicative of the current azimuth of a rotating antenna,

target register means for storing a list of target words each including starting and ending azimuth, range and amplitude data for a designated target within the current one of a plurality of predetermined azimuth sectors,

at least one data stack register means providing a plurality of separately loadable range bins corresponding to progressively farther designated ranges,

means with access to said target register means and azimuth signal for finding in said list each target word whose starting and ending azimuth includes the current azimuth and for entering the amplitude data for each such target word in the data stack range bin whose range designation corresponds to the range data of the target word,

means for reading out the contents of said data stack register means bin-by-bin in sequence according to their progressively increasing designated ranges at a clock rate related to the interval between said designated ranges, and

video converter means for producing a video signal output related to the output of said data stack register means to simulate the target return signals at the current azimuth.

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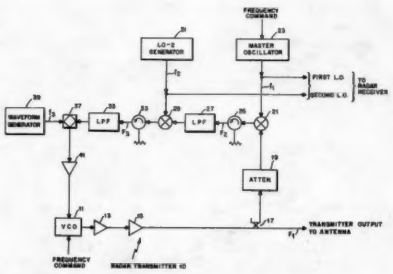
**4,591,859**

## RADAR TRANSMITTER

**Richard A. Campbell, Concord, Mass., assignor to Raytheon Company, Lexington, Mass.**

**Filed Sep. 20, 1982, Ser. No. 419,678**
**Int. Cl.[4] G01S 7/28; H04B 1/04**
**U.S. Cl. 343—5 AF** **3 Claims**




1. A radar transmitter comprising:

(a) a voltage-controlled oscillator for generating a radio frequency signal having a frequency within a predetermined band of frequencies;

(b) a bandpass amplifier, responsive to the radio frequency signal out of the voltage-controlled oscillator, for raising the power of such signal to a predetermined high level, such amplifier also generating a noise signal;

(c) means for sampling and downconverting the radio frequency signal and noise signal out of the bandpass amplifier to provide a corresponding low frequency signal at a predetermined low level; and

(d) a phase detector, responsive to the corresponding radio frequency signal at a low level and to a low frequency reference signal, for producing a frequency control signal for the voltage-controlled oscillator.

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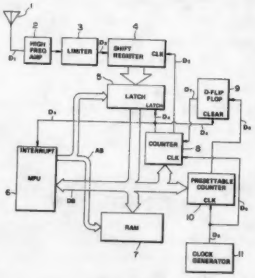
**4,591,860**

## LORAN-C RECEIVER

**Hiroshige Fukuhara, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Japan**

**Filed May 4, 1984, Ser. No. 608,575**
**Claims priority, application Japan, Jun. 7, 1983, 58-101444**
**Int. Cl.[4] G01S 1/24**
**U.S. Cl. 343—390** **10 Claims**




1. A loran-C receiver comprising:

(a) a sample means for producing a plurality of sample pulses in synchronism with each of pulses of the loran-C signal and sampling a received signal containing the loran-C signal in response to each of the sample pulses;

(b) a memory means for storing sampled values of said received signal sampled in response to each of the sample pulses over a predetermined interval and for adding corresponding sampled values of the received signal for subsequent predetermined intervals to the stored sampled values;

(c) means for determining whether the stored and added sampled values fall outside a predetermined reference range and for sensing peaks in the carrier wave of the loran-C signal in the received signal on the basis of the determined result;

(d) means for finding a given peak of the carrier wave in each of the modulated pulse of the loran-C signal.

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**4,591,861**

## DOPPLER VOR

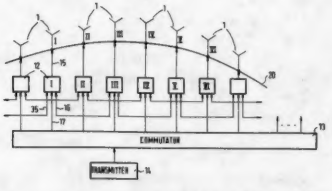
**Werner Kautz, Korntal, Fed. Rep. of Germany, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Mar. 15, 1984, Ser. No. 589,970**

**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1983, 3309784**

**Int. Cl.[4] G01S *1/44***

**U.S. Cl. 343—404** **1 Claim**




1. Doppler very high frequency omnidirectional range comprising at least a transmitter (**14**), a commutator (**13**), a central antenna, and a plurality of omnidirectional antennas (**1**) arranged equidistantly on a circle, the commutator activating the antennas in a manner to simulate the rotation of two opposite antennas around the circle, and as uniform a rotation as possible being simulated by additionally activating at least one of the two antennas adjacent to said two opposite antennas, and further comprising four-terminal reciprocal power dividers (**12**) connected between the commutator and each of the antennas and each having two of its terminals connected to the commutator and to one of the antennas (III), respectively, characterized in that the two remaining terminals of the power dividers are connected to the respective next antennas but one (I, V) by RF lines (**16, 35**), and that the division ratio of the power divider and the lengths of the RF lines over which a portion of the transmitter signal assigned to an antenna (III) is fed to the respective next antennas but one (I, V) are chosen so that the radiation patterns of the antenna group formed by a first active antenna (III) and the two adjacent antennas on both sides thereof (I, II, IV, V) and of the antenna group formed by the second active antenna (IV) adjacent to the first active antenna (III) and by the two adjacent antennas (II, III, V, VI) on both sides of said second antenna are substantially elliptical, and that for a user, the superposition of said two approximately elliptical radiation patterns gives an approximately circular radiation pattern regardless of the user's direction relative to the very high frequency omnidirectional range.

**4,591,862**

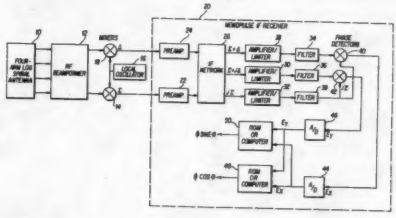
## MONOPULSE RECEIVER FOR A FOUR ARM LOG SPIRAL ANTENNA

**Ross A. Parkhurst, 10308 Fleming Ave., Bethesda, Md. 20814, and John O. Wedel, 4218 Southfield Rd., Ellicott City, Md. 21043**

**Filed Sep. 4, 1984, Ser. No. 647,321**

**Int. Cl.[4] G01S *5/02, 13/00***

**U.S. Cl. 343—427** **9 Claims**




1. A method of determining the direction of a source of radio signals received by a four arm log spiral antenna, comprising the steps of:

processing signals from said antenna by an RF beam-forming network to generate sum and difference RF signals:

heterodyning said sum and difference RF signals to an intermediate frequency to produce a sum IF signal $\Sigma$ and a difference IF signal $\Delta$;

processing said $\Sigma$ and $\Delta$ signals to simultaneously generate three IF signals, $\Sigma+\Delta$, $\Sigma-j\Delta$, and $j\Sigma$, respectively;

limiting the three signals $\Sigma+\Delta$, $\Sigma-j\Delta$, and $j\Sigma$, to a predetermined maximum amplitude;

processing the limited signals $\Sigma-j\Delta$ and $j\Sigma$ to generate a voltage $E_y$ corresponding to the sine of the phase angle $\alpha$ of the limited signal $\Sigma-j\Delta$ relative to the limited signal $j\Sigma$;

processing the limited signals $\Sigma+\Delta$ and $j\Sigma$ to generate a voltage $E_x$ corresponding to the sine of the phase angle $\beta$ of the limited signal $\Sigma+\Delta$ relative to the limited signal $j\Sigma$;

determining a first rectangular coordinate direction angle $e_A$ of the radio source relative to a boresight of the antenna from said voltages $E_x$ and $E_y$; and

determining a second rectangular coordinate direction angle $e_B$ of the radio source relative to the boresight of the antenna from said voltages $E_x$ and $E_y$.

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**4,591,863**

## LOW PROFILE ANTENNA SUITABLE FOR USE WITH TWO-WAY PORTABLE TRANSCEIVERS

**Stelios J. Patsiokas, Hollywood, Fla., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Apr. 4, 1984, Ser. No. 596,862**

**Int. Cl.[4] H01Q *1/48***

**U.S. Cl. 343—702** **6 Claims**

1. A low profile antenna structure suitable for use over a range of frequencies about a center frequency and for use in conjunction with a portable two-way transceiver, said antenna structure comprising:

a counterpoise including

a substantially planar conductive top sheet having top and bottom opposed major surfaces and having first and second opposed ends;

a first conductive side sheet having opposed ends, one end of which is coupled to the first end of said top sheet, said first side sheet being oriented substantially perpendicular to said top sheet and extending away from the bottom surface of said top sheet;

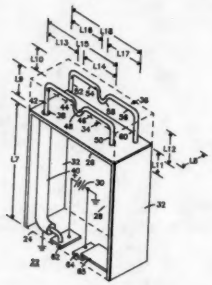
a second conductive side sheet having opposed ends, one end of which is coupled to the second end of said top sheet, said second side sheet being oriented substantially

perpendicular to said first sheet and extending away from the bottom surface of said top sheet;

said top sheet and said first and second side sheets being oriented in a substantially U-shaped configuration with respect to each other;

a driven radiating element having a driven end and a free end, said driven radiating element being situated adjacent and atop the top surface of said top sheet, said driven radiating element having a total electrical length of approximately one-quarter of a wavelength at said center frequency;

a feed point coupled to said driven end for coupling radio frequency energy to said driven radiating element; and



a parasitic radiating element having first and second ends and being situated adjacent and atop the top surface of said top sheet, said parasitic radiating element having a total electrical length of approximately one quarter of a wavelength at said center frequency, said parasitic radiating element being substantially parallel to said driven radiating element and separated therefrom by a distance of approximately 1/20th of a wavelength so that the driven end of said driven element and the first end of said parasitic element, and the free end of said driven element and the second end of said parasitic element, respectively, are closest together, the second end of said parasitic element being coupled to said conductive sheet.

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**4,591,864**

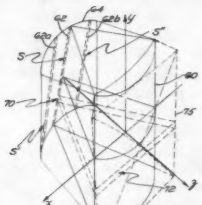
**FREQUENCY INDEPENDENT TWISTED WAVE FRONT CONSTANT BEAMWIDTH LENS ANTENNA**

**Robert L. Sternberg, Noank, Conn., and Warren A. Anderson, Tiverton, R.I., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jun. 13, 1983, Ser. No. 503,977**

**Int. Cl.[4] H01Q *15/02***

**U.S. Cl. 343—754** **2 Claims**



1. A constant beamwidth lens antenna comprising:

a cylindrical lens having a longitudinal reference axis parallel to the generators of the cylindrical surface of said cylindrical lens and a curved cylindrical focal surface, said focal surface having a longitudinal reference axis parallel to the longitudinal reference axis of said lens; and

a line source conforming with and located on said curved cylindrical focal surface and disposed at a transverse angle with respect to said longitudinal lens reference axis.

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**4,591,865**

**THIN-STRUCTURE DUAL DIRECTIONAL ANTENNA FOR HIGH FREQUENCIES**

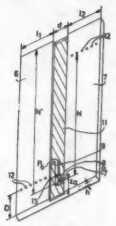
**Yves S. Canal, Massy, France, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 30, 1983, Ser. No. 556,506**

**Claims priority, application France, Dec. 3, 1982, 82 20290**

**Int. Cl.[4] H01Q *13/10***

**U.S. Cl. 343—767** **10 Claims**



1. A directional antenna having a radiation angle $\theta_0$ formed by a body having a parallelepiped shape, said body comprising:

(a) a dielectric sheet of thickness h;

(b) electrically-connected conductive plating on opposite sides and edges of the dielectric sheet, the plating on one side forming a ground plane and the plating on the opposite side forming first and second conductive surfaces of widths $l_1$ and $l_2$, respectively, separated by a longitudinally extending gap of width d, said gap exposing a band of the dielectric sheet; and

(c) a conductive strip extending across the gap and electrically connecting the first and second conductive surfaces at respective feedpoints near a first end of the gap, said conductive strip containing a feedpoint for the antenna at a predetermined location therein; and where:

(1) said dielectric sheet and the first and second conductive surfaces have a combined thickness e, said width d being several times the thickness e;

(2) each of said first and second conductive surfaces has a length L, measured along the gap, over which said conductive surface is conductively isolated from the ground plane, said length L being greater than twice the operational wavelength $\lambda$ of the antenna;

(3) the width d has a value between $0.2\lambda$ and $0.6\lambda$; and

(4) the widths $l_1$ and $l_2$ sum to a total width $l_t$ having a value between $0.2\lambda$ and $0.6\lambda$.

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**4,591,866**

**MULTI-BEAM ANTENNA AND ITS CONFIGURATION PROCESS**

**Yoshihiko Mizuguchi, and Fumio Watanabe, both of Tokyo, Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 515,839, Jul. 21, 1983. This application Aug. 21, 1985, Ser. No. 767,984**

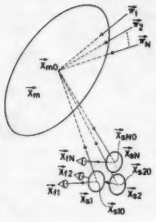
**Claims priority, application Japan, Feb. 4, 1983, 58-16129**

**Int. Cl.[4] H01Q *19/19***

**U.S. Cl. 343—781 P** **1 Claim**

1. A multi-beam antenna comprising a main reflector, a plurality of L sub-reflectors, one for each of the beams of said

multi-beam antenna, and a plurality of L horns for exciting the main reflector, where L is an integer, characterized in that the beam phase errors generated at the main reflector are corrected by said sub-reflectors, and the shape of i-th one of said sub-reflectors, where i is in integer 1, 2, 3 . . . L, is determined by the equation:



$$\vec{X}_{si} = \vec{X}_m + S_i \vec{i}_{si} \quad (1)$$

where

$$\vec{i}_{si} = -\vec{\pi}_i + 2(\vec{\pi}_i \cdot \vec{n}_m)\vec{n}_m$$

$$S_i = \frac{(K_i - \vec{\pi}_i \cdot \vec{X}_m)^2 - (\vec{X}_m - \vec{X}_{fi})^2}{2\{K_i - \vec{\pi}_i \cdot \vec{X}_m + \vec{i}_{si}(\vec{X}_m - \vec{X}_{fi})\}}$$

$X_{si}$ is a sub-reflector vector, $X_m$ is a main reflector vector, $\pi_i$ is a direction vector of the wave front arriving at the main reflector, $X_{fi}$ is a feed horn vector, n is a unit normal vector at beam reflection point on the main reflector, and $K_i$ is the total ray path length.

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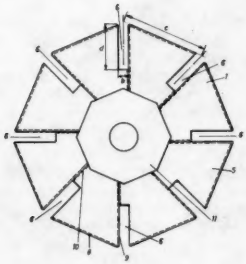
**4,591,867**

## ATTENUATION APPARATUS FOR AN AERIAL ARRAY

**Allan H. E. Englund, Älvsjö , and Stefan G. Eriksson, Mönsterås, both of Sweden, assignors to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden**

**Filed Feb. 10, 1984, Ser. No. 579,016**
**Claims priority, application Sweden, Feb. 16, 1983, 8300860**
**Int. Cl.[4] H01Q *1/52***
**U.S. Cl. 343—841** **5 Claims**



1. Attenuation apparatus for attenuating electromagnetic waves between two vertically polarized directional aerials placed one above the other for simultaneous operation within the same frequency band, said apparatus comprising a grounded screen and spacer disposed one on the other between the aerials, said grounded screen being electrically tuned to the mean wavelength λ of the frequency band of operation of the aerials by the provision of an even number of substantially radially directed cutouts, each having a length of approximately λ/4 and a spacing of approximately λ/2 at the screen periphery, between radially directed pitch center lines of adjacent cutouts, said spacer having a length of approximately 0.70λ.

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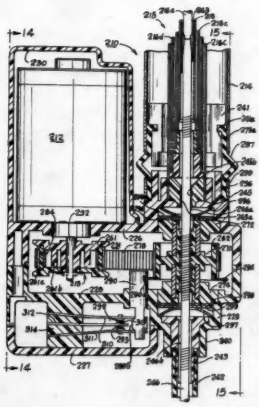
**4,591,868**

## COLLAPSIBLE MOTOR OPERATED ANTENNA

**Dar L. Cusey, and Roy A. Kitchens, both of Montgomery, Ala., assignors to National Industries, Inc., Montgomery, Ala.**

**Continuation-in-part of Ser. No. 563,402, Dec. 7, 1983, abandoned, which is a continuation-in-part of Ser. No. 366,918, Apr. 9, 1982, abandoned. This application Jul. 2, 1985, Ser. No. 751,017**
**Int. Cl.[4] H01Q *1/10***
**U.S. Cl. 343—903** **23 Claims**



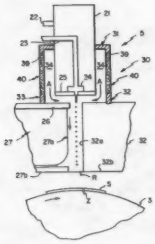
1. A retractable motor-driven antenna comprising a supporting tube, telescoping antenna sections collapsible within the tube, a reversible electric motor, transmission means connected between the motor and antenna sections to extend and retract the sections relative to the tube, a control switch for controlling operation of the motor, and a housing enclosing the motor, switch, and drive means and connected with the supporting tube and antenna sections, said motor located and oriented beside the tube, with an armature shaft of the motor parallel with the tube and antenna sections, said transmission means including a drive belt and first and second speed reducing pulley wheels beneath the motor and antenna sections, the first being on the motor shaft and the second supported for rotation in the housing axially aligned with the antenna sections, an internally threaded rotary nut supported for rotation in the housing coaxially with the second pulley, means between and interconnecting the nut and second pulley wheel for permitting relative restrained rotary motion between the nut and second pulley wheel under predetermined load, a flexible cord with external thread portions extending through and threadedly engaged with said nut and connected to an antenna section, and means stationary with respect to the housing to prevent rotation of the cord.

**4,591,869**

## INK JET PRINTING APPARATUS AND METHOD PROVIDING AN INDUCED, CLEAN-AIR REGION

**James A. Katerberg, Kettering; Gregory M. Kopp, Huber Heights, and Michael J. Piatt, Enon, all of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 12, 1985, Ser. No. 722,552**
**Int. Cl.[4] G01D *15/18***
**U.S. Cl. 346—1.1** **27 Claims**



**1**. In ink jet printing apparatus of the type having (i) a print head assembly, including an orifice plate which forms a droplet stream(s) directed toward a droplet impact zone and (ii) means for providing relative movement between said print head assembly and a print substrate, the improvement comprising:

(a) wall means for forming a substantially enclosed region around said orifice plate, said wall means having an outlet for such droplet stream(s);

(b) means for forming an air inlet passage such that external air can flow from the exterior of said wall means to a portion of said enclosed region, that is upstream, with respect to the droplet flight direction, from said orifice plate; and

(c) means for filtering air passing into said enclosed region through said inlet passage,

whereby protective air will be induced to flow into said enclosed region through said inlet passage and out of said enclosed region through said outlet by printing movements of ink droplets and/or relative movement between said print head assembly and print substrate.

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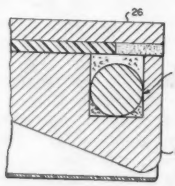
**4,591,870**

## INK JET PRINTING APPARATUS AND METHOD WITH CONDENSATE-WASHING FOR PRINT HEAD

**Hilarion Braun, Xenia; Mark E. Brown, West Carrollton, and Michael J. Piatt, Enon, all of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 12, 1985, Ser. No. 722,546**
**Int. Cl.[4] G01D *15/18***
**U.S. Cl. 346—1.1** **19 Claims**



**19**. Ink jet printing apparatus of the type having (i) an upper print head means for generating an ink droplet stream(s) from ink supplied thereto, (ii) a lower print head means, for influencing droplets passing thereby and (iii) means for supplying pressurized ink flow to said upper print head means, the improvement comprising:

(a) means for heating operative surfaces on said lower print head means;

(b) means for directing a drying air flow across operative surfaces of said lower print head means; and

(c) control means for sequentially:

(1) actuating a condensation cycle wherein said droplet stream(s) are directed past said lower print head means with said print head means at a solvent condensing temperature;

(2) actuating a drying cycle wherein high velocity air is directed past said lower print head means; and

(3) actuating said heating means to raise said lower print means above said condensing temperature.

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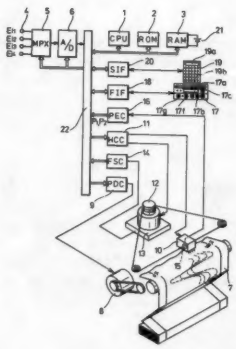
**4,591,871**

## RECORDER WITH FUNCTIONS TO CORRECT EXPANSION OR CONTRACTION OF RECORDING PAPER

**Kazufumi Ohta, Tokyo, Japan, assignor to Yokogawa Hokushin Electric Corporation, Tokyo, Japan**

**Filed Oct. 2, 1984, Ser. No. 656,865**
**Claims priority, application Japan, Oct. 4, 1983, 58-185311; Oct. 7, 1983, 58-156727[U]**
**Int. Cl.[4] G01D *9/28***
**U.S. Cl. 346—49** **13 Claims**



**1**. In a recorder of the type wherein an analog-to-digital converter converts analog measured input signals into digital sampling data for a predetermined sampling period, a microprocessor processes said signals and a recording head scans to record on a recording paper for a predetermined recording period, said recording paper having a 0% end and a 100% end of a width dimension, being perpendicular to the direction of travel of said recording paper, the improvement comprising:

a circuit for generating recording head position signals in relation to the position of said recording head;

a paper end detecting sensor provided on said recording head; means for resetting said circuit for generating when said sensor detects said 0% end of said recording paper; and

a paper width sensor means for reading, as a paper width signal, recording head position signals from said circuit for generating when said sensor detects said 100% end of said recording paper;

wherein computation of a recording position signal corresponding to the amplitude of each measured input signal is performed in accordance with said sampling data taken in said microprocessor, corrective calculation of said recording position signal is performed in accordance with both a reference width of said recording paper and width of said recording paper detected by said paper width sensor

means, thereby to produce a recording position correcting signal for each measured input signal according to expansion or contraction of said recording paper, and to sequentially record on said recording paper by said recording head points where said recording position correcting signal and said recording head position signal are in equilibrium.

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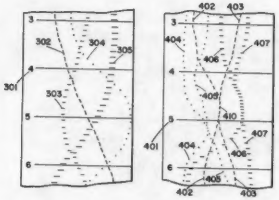
## 4,591,872
## X-Y DISTINGUISHABLE MULTI-TRACE CODING FOR MULTIPARAMETER RECORDING OF A SINGLE STYLUS RECORDER

**Edward Cooper, San Diego, Calif., assignor to Power Science, Inc., San Diego, Calif.**

**Continuation of Ser. No. 423,602, Sep. 27, 1982, abandoned. This application Oct. 10, 1984, Ser. No. 659,252**

**Int. Cl.[4] G01D** *9/36, 15/16*

**U.S. Cl. 346—62** **4 Claims**




1. An apparatus for recording plural time-varying signals by a trace recorder, including a single, electromagnetically driven stylus comprising:

timing means for providing a timing signal having a repeating sequence of respective unequal timing periods;

multiplexing means responsive to said timing signal for, during each of said timing periods, applying a respective one of said time-varying signals to said recorder;

modulating means responsive to said timing signal for providing, during one said timing period, a function signal having a characteristic waveform;

summing means connected to said recorder and to said multiplexing and modulating means for, during said one timing period, adding said function signal to the timevarying signal applied during said timing period; and

said modulating means includes a modulating signal source for generating said function signal, a first gate means responsive to said timing signal during a respective one of said timing periods for preventing said modulating signal source from providing a function signal, and second gate means responsive to said timing signal during another respective one of said timing periods for enabling said modulating signal source to provide a function signal.

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## 4,591,873
## INK JET PRINTING APPARATUS WITH ORIFICE ARRAY CLEANING SYSTEM

**James D. McCann, Waynesville; Michael J. Piatt, Enon, and Theodore F. Williams, Beavercreek, all of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 12, 1985, Ser. No. 722,494**

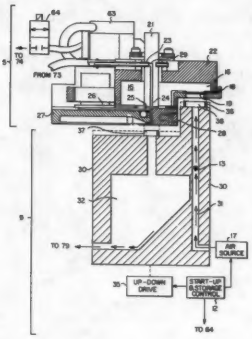
**Int. Cl.[4] G01D** *15/18;* **B08B** *9/00;* **B01D** *21/18*

**U.S. Cl. 346—75** **8 Claims**

1. In ink jet printing apparatus of the type having (i) a print head, including an ink cavity and an ink inlet and an ink outlet to said cavity and (ii) an orifice plate in liquid communication with said ink cavity and ink circulating means for supplying ink to said inlet and receiving ink from said outlet, the improvement comprising:

(a) sealing means for enclosing a region around the exterior of said orifice plate;

(b) means for supplying air into said region to establish positive pressure, with respect to the ink cavity pressure, in said region; and




(c) means for selectively varying the pressure of ink in said ink cavity between a positive pressure condition and a negative pressure condition relative to the pressure in said region.

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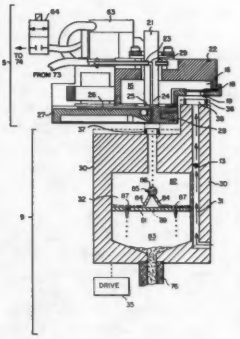
## 4,591,874
## INK JET PRINTING APPARATUS HAVING IMPROVED HOME STATION DIAGNOSTIC SYSTEM

**Michael J. Piatt, Enon, Ohio, assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 12, 1985, Ser. No. 722,553**

**Int. Cl.[4] G01D** *15/18*

**U.S. Cl. 346—75** **19 Claims**




1. In ink jet printing apparatus of the type having a print head assembly that: (i) includes means for producing droplet streams, means for charging selected droplets in those streams and means for catching selectively charged droplets and (ii) is movable across a printing region and into a nonprinting position adjacent the printing region, an improved print head assembly home station comprising:

(a) means, located at said non-printing position, for collecting droplet streams from said print head assembly;

(b) means, located within said collecting means, for sensing electrical charge conditions of droplets in said streams;

(c) means for returning ink from said collecting means for recirculation to said print head assembly; and

(d) isolating means, located and extending a substantial distance into said collecting means, for forming an electrical decoupling between ink contacting said sensing means and ink in said returning means.

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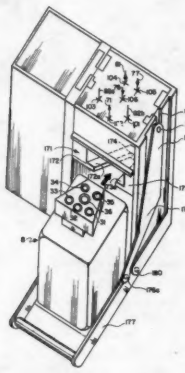
**4,591,875**

## INK CARTRIDGE AND COOPERATIVE CONTINUOUS INK JET PRINTING APPARATUS

**James D. McCann, Waynesville, Ohio, assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 12, 1985, Ser. No. 722,558**
**Int. Cl.[4] G01D** *15/18*
**U.S. Cl. 346—75** **13 Claims**



1. For use with continuous ink jet printing apparatus of the kind including an ink supply for feeding ink to a print head assembly and ink return means for returning ink from the print head assembly, an ink cartridge comprising:

(a) side, top and bottom wall means forming an ink supply and return reservoir;

(b) means in said top wall means for defining: (i) an ink supply port and (ii) an ink return port; and

(c) first and second valve means, respectively in said supply and return ports, both of said valve means being biased to a normally closed condition,

said supply and return ports and their respective valve means being constructed and located for respective valve-opening engagements, with the supply and return means of such apparatus.

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**4,591,876**

## THERMAL PRINTER

**Mineo Nozaki, Kawasaki; Osamu Asakura, Tokyo; Masasumi Nagashima, Yokosuka, and Yoshio Uchikata, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 27, 1982, Ser. No. 424,410**
**Claims priority, application Japan, Oct. 2, 1981, 56-156111**
**Int. Cl.[4] G01D** *15/10;* **H05B** *1/00;* **B41J** *3/20*
**U.S. Cl. 346—76 PH** **12 Claims**

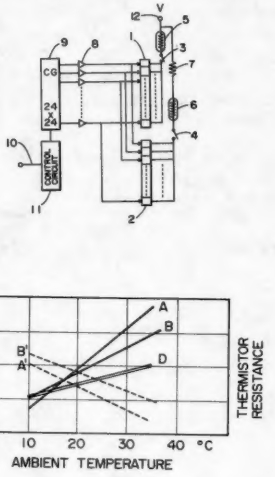
1. A thermal printer comprising:

a thermal head of one of at least two types having a plurality of heater elements and respective different operating characteristics, said thermal head being removably mountable to the printer;

driver means operable in response to a print signal for driving said heater elements;

detection means for detecting the type of said thermal head mounted to the printer; and

control means for controlling the heating of a first type of said thermal head in dependence on a first ambient temperature vs. power characteristic curve when said detection means detects that said first type of thermal head is mounted to the printer and for controlling the heating of a second type of said thermal head in dependence on a second ambient temperature vs. power characteristic




curve when said detection means detects that said second type of thermal head is mounted to the printer so that said first and second types of thermal head print with substantially the same print density.

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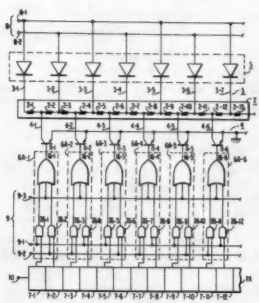
**4,591,877**

## THERMAL RECORDING HEAD DEVICE

**Yoshiyuki Shiratsuki, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan**

**Filed Jan. 20, 1983, Ser. No. 459,555**
**Claims priority, application Japan, Feb. 10, 1982, 57-18787**
**Int. Cl.[4] G01O** *15/10*
**U.S. Cl. 346—76 PH** **3 Claims**



1. A thermal recording head device comprising:

a belt-shaped resistive member formed on an insulating substrate;

a plurality of leads divided into first and second grounds of leads, said first and second groups of leads extending alternatively from said belt-shaped resistive member and dividing said belt-shaped resistive member into a plurality of heat generating elements;

a plurality of power supply terminals;

means for selectively coupling leads of said first group of leads to selected ones of said power supply terminals;

a plurality of switching elements arranged in an array, each of said switching elements being connected between a ground terminal and a corresponding lead of said second group of leads;

a register for storing video signal bits, said video signal bits being equal in number of said heat generating elements;

means for generating at least one video control signal;

a plurality of video signal input gate circuits arranged in an array for controlling a conductive state of corresponding ones of said switching elements, each of said video signal input gate circuits having signal inputs connected to predetermined corresponding outputs of said register, an output connected to a corresponding one of said switching elements, and at least one control input connected to receive at least one video control signal for controlling switch signal input of the gate circuit is gated to said output of said gate circuit;

wherein said means for selectively coupling leads of said first group of leads to said selected ones of said power supply terminals comprises a plurality of diodes, one of said diodes being provided for each lead of said first group of leads, and wherein said power supply terminals are two in number; and

wherein each of said video signal input gate circuits comprises an AND-OR gate comprising first and second two-input AND gates and an OR gate having first and second inputs coupled to outputs of said AND gates, said AND gates each having a first input connected to a corresponding output of said register.

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**4,591,878**

## THERMAL PRINTER

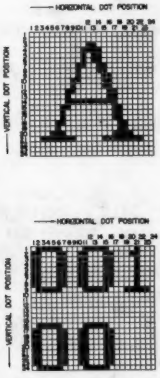
**Akira Sasaki; Kazuyuki Mashiko; Shouji Saitoh, and Akiyoshi Hakoyama, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Sep. 12, 1984, Ser. No. 649,655**

**Claims priority, application Japan, Sep. 13, 1983, 58-167619**

**Int. Cl.[4] H04N** *1/393, 1/21*

**U.S. Cl. 346—76 PH** **1 Claim**




1. A serial-type thermal printer provided in a controller thereof with a dot-matrix data converter which transforms print data supplied in the form of symbolized character code from a host system or the like into dot matrix data, a dot line buffer for storing converted dot matrix data, and a shift register which receives dot matrix data from said dot line buffer in correspondence to a plurality of aligning thermal resistor elements provided in a print head, a head driver for said thermal resistor elements being activated by data in said shift register in a timing relationship with the movement of said print head, wherein said dot-matrix data converter performs distinct dot-matrix arrangement for characters to make character height half or less than that of usual printed character, a plurality of lines of dot matrix data for contracted characters being stored in said dot line buffer, the contents of said dot line buffer being transferred to said shift register for activating said head driver.

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**4,591,879**

## WINDING MECHANISM FOR TAPE-LIKE WEB

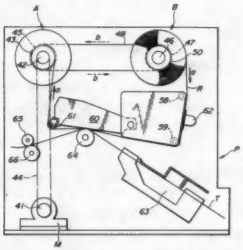
**Yuuji Yokota, Iwate; Hiroshi Kajiya, Tokyo, and Kazuhiro Karuishi, Iwate, all of Japan, assignors to Kabushiki Kaisha Sato, Japan**

**Filed Jan. 2, 1985, Ser. No. 688,501**

**Claims priority, application Japan, Jan. 28, 1984, 59-12826; Mar. 16, 1984, 59-49251**

**Int. Cl.[4] B41J** *35/08*

**U.S. Cl. 346—76 PH** **16 Claims**



1. Apparatus for avoiding slackening and for preventing meandering of a rolled, tape-like flexible web, wherein the apparatus comprises:

a feeding section including a web feeding reel for feeding a web and a first means for supporting the web in a first direction around the first supporting means for feeding the web from the feeding reel;

a winding section including a web take-up reel and respective second means for supporting the take-up reel, and the take up reel being rotatable to take up and wind up on it the web feed from the feeding reel;

means for applying a force to rotate take-up reel;

the winding section including transmitting means connected with the feeding reel for applying force to the feeding reel in the direction opposite the unwind direction of the feeding reel and in opposition to a force for moving the feeding reel applied by force being transmitted by the transmitting means being less than said force that is applied by the web, whereby said force applied by the transmitting means does not prevent the web from being fed from the feeding section to the winding section and instead absorbs slack in the web being fed; and

a braking device connected with the web for braking the feeding of the web.

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**4,591,880**

## METHOD OF CORRECTING DISTORTION OF AN IMAGE REPRODUCED BY AN IMAGE REPRODUCING SYSTEM

**Ikuo Mitsuka, Shiga, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan**

**Filed Jun. 7, 1983, Ser. No. 501,872**

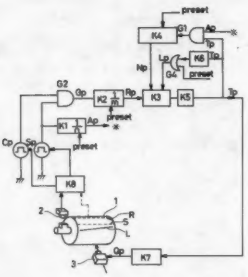
**Claims priority, application Japan, Oct. 2, 1982, 57-173720**

**Int. Cl.[4] G01D** *9/42;* **H04N** *1/30*

**U.S. Cl. 346—108** **17 Claims**

1. In a method of correcting distortion of images reproduced by an image reproducing system, which image is recorded in a sequence of consecutive scan lines by a recording beam con-

trolled by an image signal on photo-sensitive material fed continuously in a subscanning direction at a prescribed feeding pitch relative to the recording beam, the improvement comprising the steps of determining a correction quantity for a




recording start position for successive scan lines in accordance with the subscanning feeding pitch and advancing a recording start position for said successive scan lines by said correction quantity determined in accordance with the subscanning feeding pitch.

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**4,591,881**

**ARM-DEFLECTING SYSTEM FOR RECORDING APPARATUS**

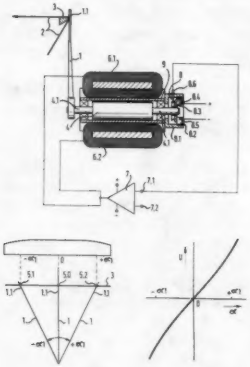
**Günter Orzikowski, Au; Rudolf Niethammer, and Jochen Bahr, both of Freiburg im Breisgau, all of Fed. Rep. of Germany, assignors to Hellige GmbH, Freiburg im Breisgau, Fed. Rep. of Germany**

**Filed Jul. 14, 1982, Ser. No. 398,209**

**Claims priority, application Fed. Rep. of Germany, Jul. 15, 1981, 3127992**

**Int. Cl.⁴ G01D** *15/16*

**U.S. Cl. 346—117 R** **4 Claims**



**1**. For use in a recording device of the type employing a pivotably deflectable arm adapted to mark a moving record carrier in accordance with the magnitude of a monitored signal,

an arm-deflecting drive system comprising:

an arm mounted within said device for rotating movement through a limited range of rotation angles to produce a mark on the record carrier;

variable resistance means providing a single signal and mounted in slip-ring relationship with the arm and device to produce a position signal indicative of the angular position of the arm and proportional to the tangent of the position angle;

differential amplifier means for generating a deflection signal in response to the difference between the monitored and position signals; and

means responsive to the deflection signal for rotating the arm to an angular position whereby the mark on the record carrier graphically depicts the magnitude of the monitored signal.

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**4,591,882**

**PRINTER ELECTROMAGNETIC CLUTCH DRIVE**

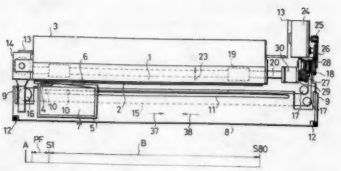
**Shuhei Takeuchi, Morioka, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed Mar. 27, 1985, Ser. No. 716,744**

**Claims priority, application Japan, Mar. 29, 1984, 59-44150[U]**

**Int. Cl.⁴ G01D** *15/34;* **B65H** *20/00, 75/30;* **B41J** *19/14*

**U.S. Cl. 346—136** **3 Claims**



**1**. A printer comprising:

(a) a reversible motor;

(b) a paper feed driver angularly movable through a desired angle in response to operation of said motor;

(c) a paper feed rotatable for feeding a sheet of paper; and

(d) means including an electromagnetic clutch operatively connected between said paper feed driver and said rotatable paper feeder, said electromagnetic clutch comprising a first yoke, a second yoke disposed in confronting relation to said first yoke normally in spaced relation thereto, and an exciting coil wound around one of said first and second yokes, said first yoke being coupled to said paper feed driver, said second yoke being coupled to said rotatable paper feeder, so that when said paper feed driver is turned in a direction to feed the sheet of paper, said exciting coil is energized to attract said first and second yokes magnetically to each other to thereby cause said paper feed driver to rotate said rotatable paper feeder to feed said sheet of paper through said electromagnetic clutch.

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**4,591,883**

**INK-JET PRINTER HEAD**

**Takuro Isayama, Tokyo, Japan, assignor to Ricoh Company, Ltd., Japan**

**Continuation of Ser. No. 481,066, Mar. 31, 1983, abandoned. This application Sep. 19, 1985, Ser. No. 778,281**

**Claims priority, application Japan, Mar. 31, 1982, 57-53433; Apr. 29, 1982, 57-71695; Jun. 30, 1982, 57-114640**

**Int. Cl.⁴ G01D** *15/16*

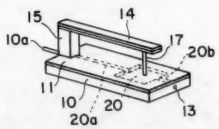
**U.S. Cl. 346—140 R** **14 Claims**

**1**. An ink-jet printer head for producing ink droplets to be used in printing, comprising:

ink holding means provided with an inlet, a nozzle opening and an ink passage extending between said inlet and said nozzle opening for holding ink in said ink passage as supplied through said inlet to be ejected through said nozzle opening, said ink holding means also including a deflectable area of predetermined shape as part of said ink passage;

driving means having a generally elongated shape overlying at a selected height above and in a plane substantially

parallel to said ink passage and being supported for producing a bending deflection at a driving end thereof in the direction substantially perpendicular to said plane toward said deflectable area in response to a print signal supplied thereto, said driving means being substantially longer than said deflectable area of said ink holding means and having a base end which is fixedly attached to said ink holding means at a location substantially separated away from said deflectable area; and




connection means provided between said deflectable area of said ink holding means and the driving end of said driving means for transmitting the deflection of said driving means to said deflectable area of said ink holding means to change the volume of said ink passage at least partly thereby causing said ink inside of said ink passage to be ejected through said nozzle opening at least partly to produce an ink droplet.

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**4,591,884**

## MULTI-FUNCTION IMAGE RECORDING APPARATUS

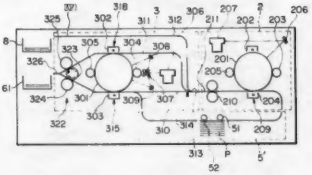
**Koichi Miyamoto; Yokohama; Yuji Takahashi, Tokyo, and Yutaka Kikuchi, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 6, 1984, Ser. No. 586,559**

**Claims priority, application Japan, Mar. 10, 1983, 58-40202; Mar. 19, 1983, 58-46701; Jun. 1, 1983, 58-97165**

**Int. Cl.⁴ G03G *15/00***

**U.S. Cl. 346—153.1** **17 Claims**




1. A multi-function image recording apparatus for recording images on a sheet, said apparatus comprising:

a first image recording device having a first sheet supply path for supplying a sheet, a first image forming portion for forming images on the sheet supplied from said first sheet supply path, and a first sheet discharge path for discharging the sheet from said first image forming portion;

a second image recording device having a second sheet supply path connected to said first sheet discharge path for supplying the sheet, a first-side image forming portion for forming an image on the first side of the sheet supplied through said second sheet supply path, and a second-side image forming portion for forming an image on the second side of said sheet;

a first conveyance path extending from said second sheet supply path through said first side image forming portion;

a second conveyance path extending from said second sheet supply path through said second-side image forming Portion; and

path change-over means for guiding the sheet to either one of said first conveyance path and said second conveyance path.

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**4,591,885**

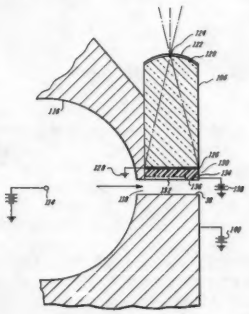
## ION PROJECTION COPIER

**Gene F. Day, Cupertino, and Lloyd D. Clark, San Francisco, both of Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Sep. 4, 1984, Ser. No. 646,549**

**Int. Cl.⁴ G01D *5/36***

**U.S. Cl. 346—159** **13 Claims**



1. A fluid jet-assisted ion projection copier characterized by comprising

a charge receptor,

means for projecting incremental images of dark and illuminated areas of an original to be copied,

means for projecting ions upon said charge receptor in accordance with said projected incremental images of dark and illuminated areas of said original, said means for projecting ions including an ion generator and a source of transport fluid for driving ions out of said ion generator through an exit channel defined by a pair of walls, and

modulation means adjacent said exit channel for controlling the passage of ions therethrough, said modulation means comprising:

a. a first source of potential connected to one of said walls,

b. a light collector through which said images of dark and illuminated areas are projected,

c. optically switchable means located to receive light from said light collector and including first conductive means, second conductive means and photoconductive means sandwiched between said first and said second conductive means, and wherein said second conductive means forms the other of said walls,

d. a second source of potential, substantially identical to said first source of potential, electrically connected to said second conductive means,

e. a source of reference potential, different from said first and second potentials, connected to said first conductive means,

whereby when portions of said optically switchable means are dark, corresponding portions of said other wall maintain said second potential and when portions of said optically switchable means are illuminated, corresponding portions of said other wall maintain said reference potential.

**4,591,886**

## DRIVING METHOD AND APPARATUS FOR OPTICAL PRINTER WITH LIQUID-CRYSTAL SWITCHING ELEMENT

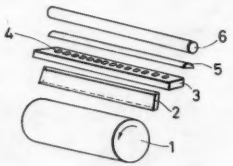
**Takao Umeda, Hitachi; Kazuya Ooishi, Toukai; Tatsuo Igawa, Kitaibaraki; Yasuro Hori, Katsuta; Yoshiharu Nagae, and Masato Isogai, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 9, 1984, Ser. No. 629,045**

**Claims priority, application Japan, Jul. 8, 1983, 58-123305**

**Int. Cl.[4] G01D** *15/14;* **H04N** *1/23, 1/29*

**U.S. Cl. 346—160** **19 Claims**




1. A driving method for an optical printer having a liquid-crystal light switching element including a ferroelectric liquid crystal sandwiched between a pair of plates provided with electrodes on adjacent surfaces thereof, the liquid-crystal light switching element being disposed between light source means and a movable photosensitive surface and being switched so as to at least one of transmit and block light from the light source means to the photosensitive surface for enabling a printing operation, the method comprising the steps of applying voltages $v_1$ and $v_2$ to the liquid-crystal switching element substantially in accordance with the equation

$$\int_{t_0}^{t_1} v_1 dt + \int_{t_2}^{t_3} v_2 dt = 0,$$

and controlling the intensity of light from the light source means incident on the liquid-crystal switching element so that incident light intensity during a period $T_2$ is weaker than the incident light intensity during a period $T_1$, where $t_0$, $t_1$, $t_2$ and $t_3$ represent times, $T_1$ $(=t_1-t_0)$ is the period during which a printing operation is effected, $T_2$ $(=t_3-t_2)$ is the period during which the photosensitive surface moves, $v_1$ is the voltage which is applied to the liquid-crystal switching element during the period $T_1$, and $v_2$ is the voltage which is applied to the liquid-crystal switching element during the period $T_2$.

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**4,591,887**

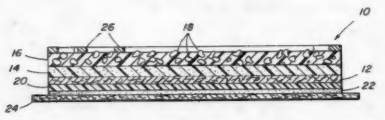
## SOLVENT RESISTANT THERMALLY PRINTABLE MATERIAL

**Roberta R. Arbree, 165 Coburn Woods, Nashua, N.H. 03063; David C. Degulis, 3 Pacific Blvd., Nashua, N.H. 03062; Henry W. Goodwin, 28 West St., Milford, N.H. 03055, and Norman T. Veillette, 189 Wheeler Rd., Hollis, N.H. 03049**

**Filed Feb. 13, 1984, Ser. No. 579,363**

**Int. Cl.[4] B41M** *5/18*

**U.S. Cl. 346—200** **16 Claims**




1. A heat-sensitive recording material resistant to background discoloration and image fading induced by exposure to hydrophobic and hydrophilic solvents, said material comprising:

A. a substrate;

B. a thermally imagewise imprintable color-producing layer affixed to a first surface of said substrate comprising a leuco dye developable upon exposure to an acidic developer material, an acidic developer, a binder material for said dye and developer, and a basic, particulate, neutralizing agent; and

C. a water-insoluble protective layer affixed to said color-producing layer, comprising an organic acid-catalyzed, covalently cross-linked resin containing dispersed spacer particles.

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**4,591,888**

## HEAT-SENSITIVE RECORDING SHEET

**Toshimi Satake; Toshiaki Minami, and Fumio Fujimura, all of Tokyo, Japan assignors to Jujo Paper Co., Ltd., Tokyo, Japan**

**Filed Sep. 14, 1984, Ser. No. 650,793**

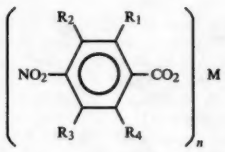
**Claims priority, application Japan, Sep. 16, 1983, 58-169269**

**Int. Cl.[4] B41M** *5/18*

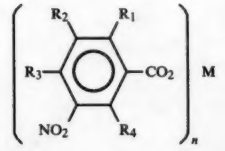
**U.S. Cl. 346—209** **15 Claims**

1. Heat-sensitive recording sheet having a color forming layer comprising a colorless basic dyestuff and a organic color-developing agent, wherein said color-forming layer contains a metal salt derivative of nitrobenzoic acid having the general formula (I) or (II)

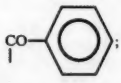
(I)




(II)




where $R_1$, $R_2$, $R_3$ and $R_4$ represent individually H, $NO_2$, halogen group, alkoxyl group, $CH_3$, $C_2H_5$, $C_3H_7$, iso-$C_3H_7$, tert-$C_4H_9$, $C_5H_{11}$ or




M represents a polyvalent metal; and n represents an integer of 2 or 3.

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**4,591,889**

## SUPERLATTICE GEOMETRY AND DEVICES

**Arthur C. Gossard, Warren, and Pierre M. Petroff, Westfield, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

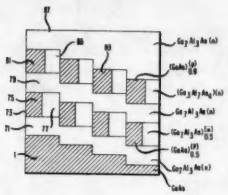
**Filed Sep. 14, 1984, Ser. No. 651,044**

**Int. Cl.[4] H01L** *27/12*

**U.S. Cl. 357—4** **22 Claims**

1. A device comprising a substrate having a surface, said surface being misoriented with respect to a major crystallographic plane, said surface having a plurality of steps, said steps having a height and a width and being arranged periodi-

cally, a first plurality of regions on a portion of said steps having a first composition, a second plurality of regions having



a second composition, said first and said second pluralities being interleaved with each other.

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**4,591,890**

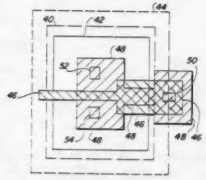
## RADIATION HARD MOS DEVICES AND METHODS FOR THE MANUFACTURE THEREOF

**Clarence A. Lund, Phoenix, and Michael D. Sugino, Mesa, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.**

**Filed Dec. 20, 1982, Ser. No. 450,869**

**Int. Cl.[4] H01L** *29/78*

**U.S. Cl. 357—23.11** **4 Claims**



**1.** A radiation hard MOS device comprising:

a p-type semiconductor base region;

a field oxide overlying a portion of said base region, said field oxide surrounding an active area of said base region;

a heavily doped p-type guard region underlying said field oxide;

first and second n-type regions in said active area of said base region, outer edges of said first and second n-type regions being separated from an inner edge of said field oxide;

a radiation hard gate oxide overlying said base region between said first and second n-type regions and extending over said field oxide; and

a polysilicon layer overlying said gate oxide, a portion of said polysilicon layer being doped, a remainder of said polysilicon layer being undoped, said doped portion of said polysilicon layer being spaced from an edge of said gate oxide in a region between said n-type regions and said field oxide.

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**4,591,891**

## POST-METAL ELECTRON BEAM PROGRAMMABLE MOS READ ONLY MEMORY

**Pallab K. Chatterjee, Dallas, and Al F. Tasch, Jr., Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

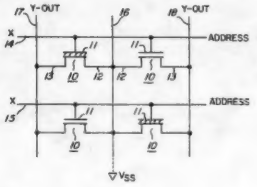
**Filed Jun. 5, 1978, Ser. No. 912,775**

**Int. Cl.[4] H01L** *29/78, 27/04;* **G11C** *11/40*

**U.S. Cl. 357—23.12** **9 Claims**

**1.** A method of making a read-only-memory comprising the steps of:

forming a plurality of insulated gate field gate effect transistors in a face of a semiconductor body, each of the transistors having a source, a drain and a gate, the transistors being in a regular pattern to provide an array of memory cells; and programming the array of memory cells by exposing the entire gate areas of selected ones of said field effect transistors to an electron beam which penetrates through the material of the gate electrodes and gate insulator, increasing the amount of positive charge at the semiconductor-insulator interface.

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**4,591,892**

## SEMICONDUCTOR PHOTOELECTRIC CONVERSION DEVICE

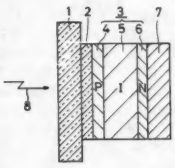
**Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Tokyo, Japan**

**Filed Aug. 22, 1983, Ser. No. 525,459**

**Claims priority, application Japan, Aug. 24, 1982, 57-146561; Oct. 18, 1982, 57-182546**

**Int. Cl.[4] H01L** *27/14, 31/00*

**U.S. Cl. 357—30** **5 Claims**




**1.** A semiconductor photoelectric conversion device comprising:

(a) a conductive substrate or (b) a first conductive layer formed on a further substrate;

a non-single-crystal semiconductor laminate member formed on said conductive substrate or said first conductive layer, including at least one I-type non-single-crystal semiconductor layer and having formed therein at least one PI, NI, PIN or NIP junction; and

a second conductive layer formed on said non-single-crystal semiconductor laminate member;

wherein said I-type non-single-crystal semiconductor layer of the non-single-crystal semiconductor laminate member contains oxygen in a low concentration of only $5\times10^{18}$ atoms/cm$^3$ or less.

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**4,591,893**

## PHOTOELECTRIC CONVERSION DEVICE UTILIZING FIBROUS SILICON

**Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Japan**

**Filed May 24, 1983, Ser. No. 497,702**

**Claims priority, application Japan, May 24, 1982, 57-87801**

**Int. Cl.[4] H01L** *27/14*

**U.S. Cl. 357—30** **12 Claims**

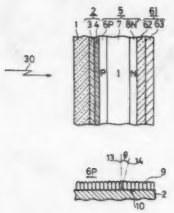
**1.** A PIN semiconductor photoelectric conversion device comprising:

a laminated member including at least a first conductivity type non-single-crystal semiconductor layer forming a first major surface of the laminated member, an intrinsic non-single-crystal semiconductor layer, and a second

conductivity non-single-crystal semiconductor layer forming a second major surface of the laminated member;

a transparent electrode making ohmic contact with the first conductivity type non-single-crystal semiconductor layer through which light enters the laminated member; and

a reflective electrode formed on the second conductivity



type non-single-crystal semiconductor layer to make ohmic contact therewith;

wherein the intrinsic non-single-crystal semiconductor layer has an amorphous structure; and

wherein either one or both of the first and the second conductivity type non-single-crystal semiconductor layers has a fibrous structure.

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**4,591,894**

**SEMICONDUCTOR DEVICE HAVING A PLURALITY OF CMOS I/O CELLS LOCATED AT THE PERIPHERY OF THE CHIP ARRANGED IN A DIRECTION PERPENDICULAR TO THE SIDES OF THE CHIP**

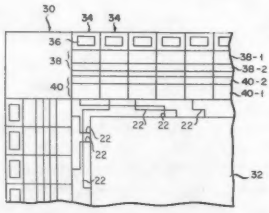
**Susumu Kawakami, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan**

**Filed Jan. 5, 1983, Ser. No. 455,838**

**Claims priority, application Japan, Jan. 20, 1982, 57-7146**

**Int. Cl.⁴ H01L *27/02, 23/48***

**U.S. Cl. 357—42** **7 Claims**



1. A MOS gate array comprising:

a semiconductor substrate of a first conductivity;

an integrated circuit located in the center of said semiconductor substrate;

a plurality of lead wires; and

a plurality of CMOS input/output cells located along the peripheral portion of said semiconductor substrate, wherein said CMOS input/output cells are connected to said integrated circuit and each of said CMOS input/output cells includes

a bonding pad located along the peripheral portion of said semiconductor substrate and connected to one of said plurality of lead wires,

a first MOS region of a first channel type located adjacent to said bonding pad, and inward from said bonding pad and the edge of said semiconductor substrate in a perpendicular direction, and

a second MOS region of a second channel type located adjacent to said first MOS region, and inward from said first MOS region and the edge of said semiconductor substrate in a perpendicular direction.

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**4,591,895**

**CMOS CIRCUIT WITH SEPARATE POWER LINES TO SUPPRESS LATCHUP**

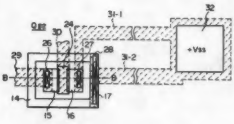
**Akihiko Ito, and Tadahiro Saito, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

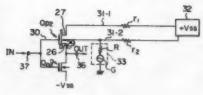
**Continuation of Ser. No. 463,896, Feb. 4, 1983, abandoned, which is a continuation of Ser. No. 171,275, Jul. 23, 1980, abandoned. This application Oct. 8, 1985, Ser. No. 785,040**

**Claims priority, application Japan, Jul. 29, 1979, 54-93992**

**Int. Cl.⁴ H01L *27/02***

**U.S. Cl. 357—42** **5 Claims**





1. A semiconductor device operatively connected to a semiconductor power source, comprising:

a semiconductor substrate;

a digital circuit, formed in said semiconductor substrate, for generating a digital signal, said digital circuit comprising at least one first CMOS (Complementary Metal Oxide Semiconductor) circuit element including a source region and a drain region both formed in said semiconductor substrate, said source region of said at least one first CMOS element operatively connected to said semiconductor power source;

an analog circuit formed in said semiconductor substrate and connected to said digital circuit through said semiconductor substrate, said analog circuit comprising at least one second CMOS circuit element connected to said first CMOS element through said substrate and including a source region and a drain region both formed in said semiconductor substrate, said source region of said at least one second CMOS element operatively connected to said semiconductor power source;

a first region, formed in said semiconductor substrate adjacent said at least one first CMOS element, for suppressing latchup and for establishing ohmic contact to said semiconductor substrate;

a second region, formed in said semiconductor substrate adjacent said at least one second CMOS element, for suppressing latchup and for establishing ohmic contact to said semiconductor substrate; and

means for suppressing transient electric noise induced in said analog circuit by the digital signal generated by said digital circuit, comprising:

a first conductor connected between said semiconductor power source and one of the source regions of said at least one first and second CMOS elements; and

a second conductor connected between said semiconductor power source and the one of said first and second regions formed adjacent the one of said at least one first and second CMOS elements having its source con-

nected to said first conductor, said first and second conductors being physically independent of each other.

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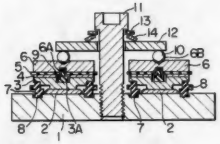
**4,591,896**

## PRESSURE-CONTACT SEALING ARRANGEMENT FOR A SEMICONDUCTOR PELLET

**Seiki Kikuchi, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 4, 1983, Ser. No. 472,237**
**Claims priority, application Japan, Mar. 5, 1982, 57-33914**
**Int. Cl.⁴ H01L** *23/42, 23/44, 23/46*
**U.S. Cl. 357—79** **16 Claims**




1. A semiconductor device comprising a base constituting one electrode and having one pellet mounting surface, a pair of semiconductor pellets mounted on said pellet mounting surface, a ring member being elastic and electrically insulating and located on said base around each of said semiconductor pellets and having a height larger than the thickness of said semiconductor pellets, a pair of conductive electrode members, each depressing and sealing said ring member and each electrically contacting a corresponding one of said semiconductor pellets, a common insulated pressure member which presses said conductive electrode members, and a single bolt which is screwed into said base and provides a pressing force for said pressure member at an intermediate portion between the pellets, the above-mentioned component parts being superposed and assembled under the pressing force.

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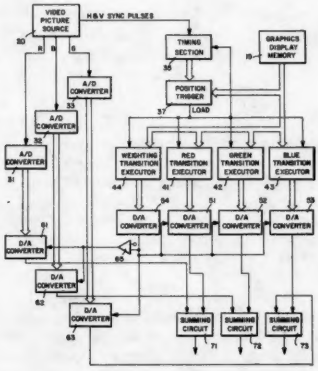
**4,591,897**

## SYSTEM FOR GENERATING A DISPLAY OF GRAPHIC OBJECTS OVER A VIDEO CAMERA PICTURE

**Steven D. Edelson, 7 Sears Rd., Wayland, Mass. 01778**

**Filed Mar. 8, 1984, Ser. No. 587,630**
**Int. Cl.⁴ H04N** *9/76*
**U.S. Cl. 358—22** **8 Claims**




1. A video display system for displaying a graphic object over a camera picture comprising a camera picture source of a first video signal representing a camera picture, a display means having a display screen and operable to produce an image on said display screen in a raster scan of said display screen and in response to an applied video signal, a memory, means to store data in said memory representing a graphic object to be displayed over said camera picture by said display means, said data identifying each edge point on said graphic object where said raster scan crosses the edge of said object in the display thereof by said display means, said data including a variable for each of said edge points varying in accordance with the slope that the edge of said object at such edge point makes with the scan line of said raster scan, and display creation means responsive to said first video signal from said camera picture source and responsive to the data stored in said memory to generate a second video signal and apply said second video signal to said display means to cause said display means to display the object represented by said data over said camera picture, said display creation means causing said second video signal to undergo a transition between said first video signal and a third video signal representing said graphic object at each of said edge points with the width of the transition varying in accordance with the slope that the object edge makes with the raster scan line at such edge point, said display means generating said second video signal within said transitions by mixing changing amounts of said first video signal with changing amounts of said third video signal.

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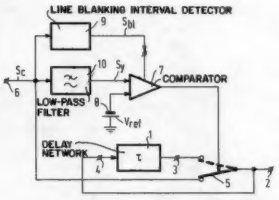
**4,591,898**

## SIGNAL-DROPOUT CORRECTION CIRCUIT FOR CORRECTING VIDEO SIGNALS DISTURBED BY SIGNAL DROPOUTS

**Eeltje deBoer, and Arie Huijser, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 3, 1984, Ser. No. 576,975**
**Claims priority, application Netherlands, Oct. 17, 1983, 8303559**
**Int. Cl.⁴ H04N** *9/88, 5/94, 5/78, 9/79*
**U.S. Cl. 358—36** **2 Claims**




1. A signal dropout correction circuit for correcting video signals disturbed by signal dropouts, which circuit comprises:

a storage circuit for storing at least one preceding line of a video picture,

switching means for connecting a video-signal output to either an output of the storage circuit or a video-signal input, and

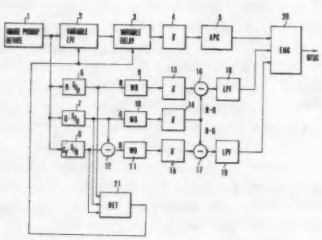
a signal-dropout detector for comparing the level of the video signal with a reference level in order to switch the switching means to such a position that the storage circuit is read out when the level of video signal drops below said reference level, and

a filter circuit for extracting the colour carrier from the video signal before the video signal is applied to the dropout detector.

## 4,591,899
## COLOR IMAGE PICKUP DEVICE

Seiji Hashimoto, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 17, 1983, Ser. No. 476,242
Claims priority, application Japan, Mar. 25, 1982, 57-47809; Apr. 1, 1982, 57-54380
Int. Cl.[4] H04N 9/07
U.S. Cl. 358—41 26 Claims

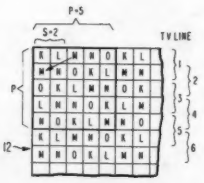


1. A color image pickup device comprising:
(a) image pickup means for converting an optical image into an electrical image signal, said signal including a plural number of color signal components;
(b) detecting means for detecting relative ratios of color signal components included in an output signal of the image pickup means; and
(c) control means for controlling the frequency characteristic of the output signal of the image pickup means in accordance with the output of the detecting means.

## 4,591,900
## ENCODING PATTERN FOR SINGLE CHIP CCD CAMERA PROCESSING SCHEME

Egon J. Heeb; Karl H. Knop, both of Zurich, and Rudolf H. Morf, Winterthur, all of Switzerland, assignors to RCA Corporation, Princeton, N.J.

Filed Dec. 12, 1983, Ser. No. 559,460
Claims priority, application United Kingdom, Mar. 14, 1983, 8306899; Sep. 14, 1983, 8324684
Int. Cl.[4] H04N 9/077
U.S. Cl. 358—44 31 Claims

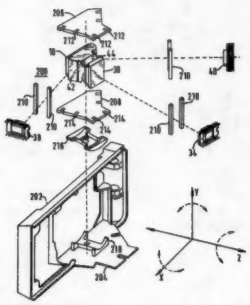



1. A camera, comprising:
a solid-state imager having a plurality of collection sites arranged in rows for collecting fields of unprocessed signals generated in response to received radiant energy from a scene;
a color filter, interposed between said scene and said imager, having color filter elements arranged in rows and columns, a pair of said rows of said color filter elements, during a given field, being instantaneously aligned with a row of said collection sites, each of said rows of said color filter elements comprising a repeating sequence of colors, sequential rows of said color filter elements being shifted in the row direction with respect to the preceding row; the combination of vertically aligned filter elements from sequential rows providing at least two independent color combinations; and
signal processing means, coupled to said imager, for generating a processed signal representative of said scene, including information related to the color content of said scene.

## 4,591,901
## TELEVISION CAMERA WITH SOLID-STATE IMAGERS MOUNTED TO A PRISM

Zygmunt M. Andrevski, Princeton Township, Mercer County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Mar. 30, 1984, Ser. No. 595,528
Int. Cl.[4] H04N 9/09, 9/093, 9/097; G02B 27/14
U.S. Cl. 358—50 29 Claims



1. A mounting assembly for use in mounting at least one image transducing means to a light output port of a light splitting prism, comprising:
a first mounting plate having upper and lower surfaces, said lower surface being securely attached to one side of said prism which is orthogonal to the plane of said light output port;
a second mounting plate having upper and lower surfaces, said upper surface being securely attached to a side of said prism opposite said one side;
first and second alignment means located about the periphery of said first and second mounting plates, respectively, said first and second alignment means each being physically located so as to be adjacent said light output port; and
support means having first and second ends coupled to said first and second alignment means, respectively, for physically supporting said image transducing means external to said prism and in the optical path of said light output port.

## 4,591,902
## MATRIX TYPE COLOR TELEVISION PANEL DRIVER CIRCUIT

Sadao Masubuchi, Tokyo, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Jan. 20, 1984, Ser. No. 572,319
Claims priority, application Japan, Jan. 28, 1983, 58-12279
Int. Cl.[4] H04N 9/30, 3/14, 5/66, 5/74
U.S. Cl. 358—59 1 Claim

1. An MOS driver circuit for a matrix-type color television panel having color picture elements including a liquid crystal display material located at intersections of line and column electrodes for displaying a color picture by driving one line of picture elements at a time in a time-sharing manner comprising:
(1) line and column electrode driver circuits for driving said line and column electrodes;
(2) a synchronizing separation circuit for separating horizontal and vertical synchronizing signals from picture signals;

(3) a color separation circuit for separating red, green and blue color signals from said picture signals; and

(4) a control circuit responsive to the synchronizing signals from said synchronizing separation circuit for controlling said line and column electrode driver circuits,

said control circuit including:

(a) a sampling clock generator for generating a sampling clock during a predetermined scanning period,

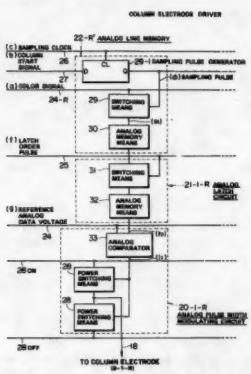
(b) a latch order pulse generator for generating a latch order pulse during a predetermined flyback period,

(c) a reference analog data voltage generator for generating a reference analog data voltage, said reference analog data voltage being repeatedly generated and varying nonlinearly with time so as to correct a nonlinear relation between an input voltage representing brightness and an actual display brightness on the liquid crystal television panel during the predetermined scanning period in synchronism with the horizontal synchronizing signal from said synchronizing separation circuit, and

(d) a column start pulse generator for generating a column start pulse in synchronism with the horizontal synchronizing signal,

said column electrode driver circuit including:

(a) an analog line memory circuit having,




(i) a plurality of sampling pulse generators each for generating independently a sampling pulse for one column in synchronism with the column start pulse and the sampling clock from said control circuit,

(ii) a plurality of first switching means comprising transmission gates for transmitting one line of separated color signals in synchronism with said sampling pulses,

(iii) a plurality of first analog memory means comprising capacitors for storing said one line of separated color signals transmitted by said first switching means as analog values, and

(iv) a plurality of first buffer amplifiers for amplifying said separated color signals stored in said first analog memory means,

(b) an analog latch circuit having,

(i) a plurality of second switching means comprising transmission gates for transmitting said one line of separated color signals stored in said first analog memory means after being amplified by said first buffer amplifiers in synchronism with said latch order pulse from said control circuit,

(ii) a plurality of second analog memory means comprising capacitors for storing said one line of separated color signals transmitted by said second switching means as analog values, and

(iii) a plurality of second buffer amplifiers for amplifying said separated color signals stored in said second analog memory means, and

(c) an analog pulse width modulating circuit having,

(i) a plurality of analog comparators comprising differential amplifiers each for comparing one of said analog values stored in said second analog memory means after being amplified by said second buffer amplifiers with the reference analog data voltage from said control circuit, and

(ii) a plurality of power switching circuits for generating column electrode driving signals each having a pulse width determined by an output of one of said analog comparators.

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**4,591,903**

## RECORDING APPARATUS

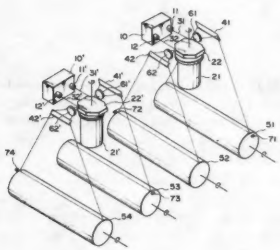
**Naoto Kawamura, Inagi, and Nobuo Kitajima, Toride, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 29, 1982, Ser. No. 445,063**

**Claims priority, application Japan, Dec. 1, 1981, 56-191747**

**Int. Cl.⁴ H04N *1/46***

**U.S. Cl. 358—75** **21 Claims**



1. A recording apparatus comprising:

plural recording members;

laser beam generating means for generating plural laser beams for image formation on said plural recording members in response to image signals, wherein individual images formed on said plural recording members are superposed to obtain a combined color image; and

deflecting means for simultaneously deflecting said plural laser beams toward said plural recording members, wherein said deflecting means is commonly used for plural laser beams.

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**4,591,904**

## PICTURE IMAGE INPUT/OUTPUT SYSTEM

**Hitoshi Urabe; Masayuki Matsumoto; Hisashi Kudo, and Osamu Shimazaki, all of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jun. 15, 1983, Ser. No. 504,511**

**Claims priority, application Japan, Jul. 9, 1982, 57-120329**

**Int. Cl.⁴ H04N *1/46***

**U.S. Cl. 358—75** **21 Claims**

1. A picture image input/output apparatus, which comprises:

(a) a digitizer which inputs graphic information;

(b) a console which inputs numerical information and operation commands;

(c) a graphic display of an interactive type which displays a graphic pattern which has been command-inputted by said digitizer and said console;

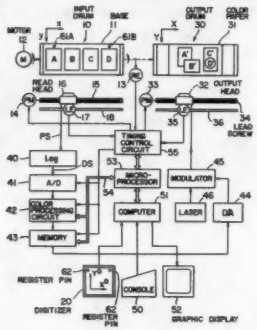
(d) a read means which optically reads original pictures mounted on a predetermined position on an input drum;

(e) a color processing/memory section which first stores the picture image data of said original pictures which have

been read by said read means after color correction, sharpness enhancement and gradation conversion process;

(f) a picture image output means which uses the picture image data from said color processing/memory section to output images on a recording material mounted on an output drum; and

(g) a computer system which is coupled respectively to said digitizer, said console and said graphic display, supervises correspondence between the coordinates of said digitizer




and the coordinates of said output drum, and correspondence between the coordinates of said input drum and said output drum, controls said read means and said picture image output means and controls operational timing of said color processing/memory section,

and in which the original pictures on said input drum are outputted in a lay-out form on the recording material of said output drum in graphic patterns and at positions commanded by said digitizer and at designated magnifications, respectively.

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**4,591,905**

## COLOR IMAGE DATA PROCESSING DEVICE FOR CORRECTING RED GHOSTS OF BLACK IMAGES

**Akio Noguchi, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan**

**Filed Jan. 16, 1984, Ser. No. 571,168**

**Claims priority, application Japan, Jan. 14, 1983, 58-3346**

**Int. Cl.[4] H04N *1/46***

**U.S. Cl. 358—75** **7 Claims**

1. In a reading device for reading a color picture, said reading device including means for generating color signals each representing one of a plurality of colors of individual picture elements, said individual picture elements comprising a target picture element having a color represented by a first signal and a plurality of peripheral picture elements positioned around said target picture element in a predetermined relationship, each individual picture element of said plurality of peripheral picture elements having a color represented by a peripheral signal, a color image data processing device comprising:

correction means, responsive to a combination of said peripheral signals and said first signal, for outputting a corrected signal representing a corrected color for said target picture element, said correction means including memory means for receiving said peipheral signals and for outputting a second signal which represents a color for said target picture element.

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**4,591,906**

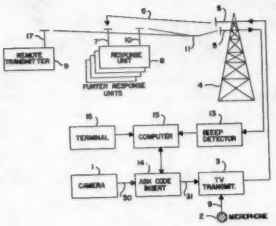
## WIRELESS TRANSMISSION FROM THE TELEVISION SET TO THE TELEVISION STATION

**Fernando Morales-Garza; Oscar Morales-Garza, and Jorge E. Ortiz-Salinas, all of Ave.Junco de la Vega #208 Colonia Roma, 64700, Monterrey, N.L., Mexico**

**Continuation-in-part of Ser. No. 561,211, Dec. 13, 1983, abandoned. This application May 29, 1985, Ser. No. 739,083**

**Int. Cl.[4] H04H *9/00***

**U.S. Cl. 358—84** **8 Claims**




1. In a bi-directional television system permitting television stations to ask questions and television signal receivers to answer those questions wherein the questions are codified synchronously on the television video signal, the improvement permitting a large number of receivers to be questioned for response from simplified responders, comprising in combination,

means at a transmission site for transmission of a video signal having coded signal queries constituting coded bits superimposed in selected horizontal line video positions and spaced at times permitting responses to be received from receiver responder units in a predetermined geographic area, and

responder units at television set locations tuned to said video signal for processing the coded queries and responding thereto to signify an answer with a single r-f burst timed to coincide with a designated horizontal line uniquely identifying each responder unit wherein all units respond with a burst of the same frequency at a unique time slot following each query wherein each responder unit and the transmitted video signal provide identification of the distance (travel time) of the responder unit from the transmission site of the video signal, and the responder units provide a response beep at a time compensating for signal transit time from the transmission site to the responder unit locations and back.

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**4,591,907**

## METHOD AND DEVICE FOR DETECTION OF MOVING POINTS IN A TELEVISION IMAGE FOR DIGITAL TELEVISION SYSTEMS PROVIDING CONDITIONAL-REPLENISHMENT BIT-RATE COMPRESSION

**Jean-Yves Catros, Rennes, France, assignor to Thomson-CSF, Paris, France**

**Filed Jul. 9, 1984, Ser. No. 628,872**

**Claims priority, application France, Jul. 13, 1983, 83 11736**

**Int. Cl.[4] H04N *7/12***

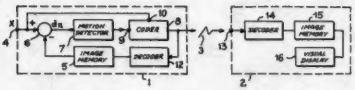
**U.S. Cl. 358—136** **6 Claims**

6. In digital television systems having conditional replenishment bit-rate compression, a television image divided into blocks of N×M points, an apparatus for detecting moving points in the television image, the apparatus comprising:

an array of shift registers for storing the inter-image differ-

ences between luminance and chrominance values for the points of each N×M block;

a matrixing element coupled to the array of shift registers for receiving the inter-image differences, the matrixing element further effecting a Hadamard transformation on the inter-image differences for converting the same differences into corresponding inter-image coefficients; and



a decision element coupled to the matrix element for receiving the inter-image coefficients, the decision element further comparing the inter-image coefficients with at least one predetermined threshold for ascertaining whether or not the points located at the center of each N×M block are moving.

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**4,591,908**

## METHOD AND APPARATUS FOR ADAPTIVE PREDICTIVE ENCODING/DECODING OF MULTI-LEVEL PICTURE SIGNALS

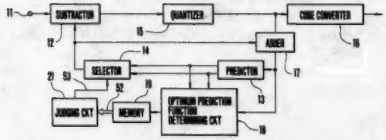
**Akira Hirano, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Apr. 4, 1984, Ser. No. 596,742**

**Claims priority, application Japan, Apr. 5, 1983, 58-59514; Apr. 13, 1983, 58-64787**

**Int. Cl.[4] H04N 7/12**

**U.S. Cl. 358—136** **8 Claims**



1. An adaptive, predictive, encoding/decoding method for a multi-level picture signal applicable to an adaptive, predictive, encoding/decoding system wherein;

on a transmission side, a single prediction signal, estimated as an optimum signal among prediction signals generated pursuant to a plurality (M) of prediction functions, is adaptively selected and the multi-level picture signal is predictively encoded by using the selected prediction signal, and on the receiving side, the multi-level picture signal is predictively decoded by procedures opposite to those on the transmission side;

said method composing the steps of:

utilizing a plurality (N) of picture elements, encoded during a prior time period and located near the present picture element to be encoded during a present time period, as reference picture elements;

detecting which one of said M prediction functions is an optimum prediction function, based on prediction error, for each reference picture element;

forming $M^N$ reference picture element states based on the result of a detection of the optimum prediction function for each of the N picture elements;

selecting when determining a prediction signal for the present picture element on the basis of the $M^N$ reference picture element states, one prediction function, which is the optimum prediction function, having a high degree of probability in each reference picture element state, thereby causing each of said $M^N$ states for a prior period of time to one to one correspond to the prediction function for the present picture element; and

determining the prediction function to be utilized for the present picture element during the present time period based upon said one to one correspondence when any one of said reference picture element states occurs.

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**4,591,909**

## INTERFRAME CODING METHOD AND APPARATUS THEREFOR

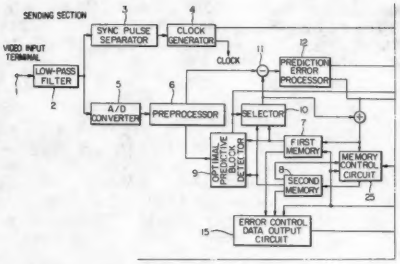
**Hideo Kuroda, and Naoki Mukawa, both of Kanagawa, Japan, assignors to Nippon Telegraph & Telephone Public Corp., Japan**

**Filed Apr. 20, 1984, Ser. No. 602,405**

**Claims priority, application Japan, Apr. 20, 1983, 58-68350; Apr. 20, 1983, 58-68351**

**Int. Cl.[4] H04N 7/137**

**U.S. Cl. 358—136** **22 Claims**



1. An interframe coding method for performing predictive coding by dividing an input video signal into blocks each of which has a predetermined size, which comprises: storing background data in second memory means arranged in addition to first memory means for storing coded picture data; detecting, as an optimal predictive block for every block of the input video signal, a block having a minimum number of prediction errors from the blocks read out from said first and second memory means is detected; and performing predictive coding by using the optimal predictive block.

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**4,591,910**

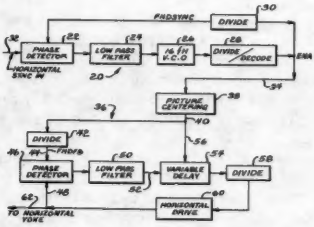
## HORIZONTAL PICTURE CENTERING

**Stephen H. Lai, Arlington Heights, and Gopal K. Srivastava, Buffalo Grove, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Mar. 14, 1984, Ser. No. 589,605**

**Int. Cl.[4] H04N 5/04**

**U.S. Cl. 358—148** **32 Claims**



1. In a television receiving system for processing a transmitted signal bearing video and horizontal synchronizing informa-

tion, said system having a display means for displaying said video information serially in a raster-like fashion in cooperation with a flyback signal coordinated with said horizontal synchronizing information, a method for centering said video information on said display means comprising:

receiving said transmitted signal;

generating a reference signal including developing an enabling signal from said horizontal synchronizing information in said received signal and variably delaying said enabling signal to produce said reference signal; and

synchronizing said flyback signal with said reference signal.

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## 4,591,911
## PICTURE FILTER USING AN AMPLITUDE CORRELATOR

**Yutaka Tanaka, and Takashi Okada, both of Yokohama, Japan, assignors to Sony Corporation, Tokyo, Japan**

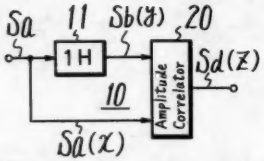
**PCT No. PCT/JP81/00409, § 371 Date Aug. 24, 1982, § 102(e) Date Aug. 24, 1982, PCT Pub. No. WO82/02310, PCT Pub. Date Jul. 8, 1982**

**Continuation of Ser. No. 413,376, Aug. 24, 1982, abandoned. This PCT application Dec. 25, 1981, Ser. No. 741,014**

**Claims priority, application Japan, Dec. 27, 1980, 55-186664**

**Int. Cl.⁴ H04N** *5/14, 9/78, 5/21*

**U.S. Cl. 358—160** **11 Claims**




1. A picture filter for extracting a selected component from a video signal which includes a noise component and which is periodically sampled to produce input samples having respective total amplitudes, said picture filter comprising;

means receiving said input samples for selecting at least first and second input samples therefrom, and

correlation detection means receiving said at least first and second selected samples and detecting correlation and non-correlation of the respective total amplitudes thereof, said correlation detecting means including means for producing said selected component without said noise component only in response to detection of positive correlation between said total amplitudes of the selected samples.

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## 4,591,912
## PEAKING CIRCUIT FOR VIDEO DRIVER STAGE

**Isaac M. Belotserkovsky, Indianapolis, and David E. Hollinden, Bloomington, both of Ind., assignors to RCA Corporation, Princeton, N.J.**

**Filed Oct. 30, 1984, Ser. No. 666,602**

**Int. Cl.⁴ H04N** *3/23, 5/68*

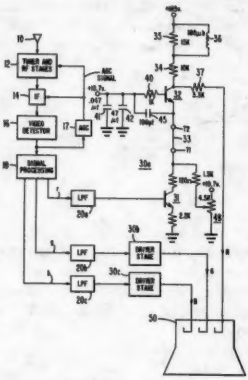
**U.S. Cl. 358—166** **5 Claims**

1. In a video signal processing and display system including a source of video signals, and an image display device having an intensity control electrode, a video output driver stage comprising:

an input amplifier with an input electrode coupled to said source of video signals, and an output electrode;

an output amplifier arranged in a cascode amplifier configuration with said input amplifier, said output amplifier having an input electrode coupled to said output electrode of said input amplifier, and an output electrode coupled to said intensity control electrode of said display device for providing video drive signals thereto; and

a peaking capacitance coupled from said input electrode of said output amplifier to a source of reference potential via



a low impedance path for peaking high frequency video signal components.

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## 4,591,913
## METHOD AND CIRCUIT APPARATUS FOR SPECIAL-EFFECT TELEVISION PICTURE TRANSITIONS IN WHICH A PICTURE COMES ON BY GROWING IN SIZE OR FADES AWAY BY DIMINISHING IN SIZE

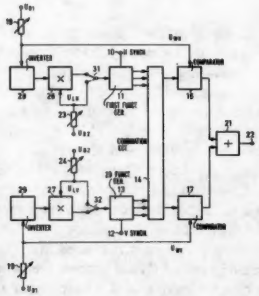
**Winfried Pohl, Büttelborn, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed May 18, 1984, Ser. No. 611,850**

**Claims priority, application Fed. Rep. of Germany, May 21, 1983, 3318659**

**Int. Cl.⁴ H04N** *5/262*

**U.S. Cl. 358—183** **9 Claims**



1. Method of special-effect television introduction of a new picture while a previous picture is still showing in which one picture changes in size showing only the remainder of the other one, in response to a monotonically changing picture-transition voltage, comprising the steps of:

beginning a transition with the new picture having its smallest size at a location offset from the center of the picture screen;

enlarging the new picture in proportion to a progressively increasing picture-transition voltage;

inverting said picture transition voltage so that the inverted voltage decreases while said picture transition voltage increases and multiplying said inverted voltage by a factor

determined by said offset of said location of the picture screen, and

applying the voltage obtained by multiplying said inverted picture-transition voltage to reduce the offset progressively at the same time that said new picture is enlarged so that, and until, the new picture is centered when it reaches full screen size.

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**4,591,914**

## APPARATUS FOR CONTROLLING POWER SUPPLY TO ELECTRONIC CIRCUITRY

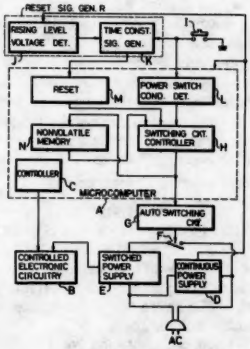
**Kunio Hakamada, Tokyo; Satoshi Ishiguro; Hideo Wakabayashi, both of Kanagawa, and Kiyoshi Ogawa, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Jan. 29, 1985, Ser. No. 696,152**

**Claims priority, application Japan, Jan. 30, 1984, 59-15825**

**Int. Cl.[4] H04N** *5/63;* **H04B** *1/16*

**U.S. Cl. 358—190** **10 Claims**




1. Apparatus for controlling the supply of power to electronic circuitry; said apparatus comprising:

a switched power supply for connection to said electronic circuitry;

automatic switch means enabling said switched power supply selectively to energize or de-energize said electronic circuitry;

a nominally continuous power supply;

reset signal generating means connected to said nominally continuous power supply for generating a reset signal in response to a rising edge of an output voltage of said nominally continuous power supply following an interruption of said output voltage;

power switch means;

reset means actuated by said reset signal;

switching circuit control means connected to said automatic switch means;

memory means connected to said switching circuit control means for memorizing the condition thereof and producing a memory output signal in response thereto; and

detecting means for detecting the condition of said power switch means and producing a detector output signal in response thereto;

said switching circuit control means being connected to said reset means, said memory means and said detecting means and generating a control signal for controlling the operation of said automatic switch means in joint dependence on said memory output signal and said detector output signal when said reset means is actuated.

**4,591,915**

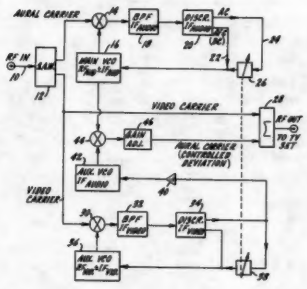
## REMOTE VOLUME CONTROL BY MEANS OF FREQUENCY MODULATION FEEDBACK LOOP

**Mircho A. Davidov, and Lance Katzfey, both of San Diego, Calif., assignors to Oak Industries Inc., Rancho Bernardo, Calif.**

**Filed Apr. 18, 1984, Ser. No. 601,595**

**Int. Cl.[4] H04N** *5/44, 5/62, 5/60;* **H04B** *7/00*

**U.S. Cl. 358—194.1** **10 Claims**




1. A TV frequency modulation feedback loop (FMFB) remote volume control including an RF input including an RF video signal and an RF sound signal, mixing means, said RF input being connected to and providing one input for said mixing means, voltage controlled oscillator means (VCO) connected to said mixing means and providing another input thereto, with the output from said mixing means being an IF FM sound signal, means for demodulating the IF FM sound signal output from said mixing means, a remotely operable deviation control connected to the output of said demodulating means for changing the amplitude of the demodulated sound signal, said deviation control being connected to and providing a deviation control input for sid VCO to thereby vary the deviation of the RF sound signal.

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**4,591,916**

## SOLID STATE IMAGE PICKUP DEVICE

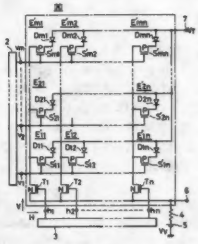
**Mitsuo Soneda, Zama; Toshikazu Maekawa, Ebina, and Takaji Ohtsu, Hatano, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**PCT No. PCT/JP83/00100, § 371 Date Nov. 25, 1983, § 102(e) Date Nov. 25, 1983, PCT Pub. No. WO83/03514, PCT Pub. Date Oct. 13, 1983**

**PCT Filed Mar. 31, 1983, Ser. No. 557,180**

**Int. Cl.[4] H04N** *3/14*

**U.S. Cl. 358—213** **5 Claims**



1. A solid state image pickup device comprising a p-type semiconductor substrate (**8**), an N-type well (**21**) formed in said substrate (**8**), first switching elements ($S_{11}'$ to $S_{mn}'$) arrayed in horizontal and vertical rows and each of said switching ele-

ments composed of P-channel insulated-gate field-effect transistors having two independent P-type regions comprising the drain (9') and the source (10') formed in said N-type well (21), said first switching elements in each vertical row having commonly connected terminals, a photoelectric conversion layer (17) disposed over the horizontal and vertical rows of said first switching elements ($S_{11}'$ to $S_{mn}'$) and electrically connected to other terminals of said first switching elements ($S_{11}'$ to $S_{mn}'$), a target electrode (18) on layer (17) and a plurality of second switching elements ($T_1$ to $T_n$) disposed respectively for the vertical rows of said first switching elements ($S_{11}'$ to $S_{mn}'$) and connected respectively to said commonly connected terminals of said first switching elements in the respective vertical rows, with the arrangement thereof wherein the horizontal rows of said first switching elements ($S_{11}'$ to $S_{mn}'$) are selectively energizable and said second switching elements ($T_1$ to $T_n$) are selectively energizable to deliver signals based on signal charges generated by said photoelectric transducer layer (17) through said first and second switching elements ($S_{11}'$ to $S_{mn}'$, $T_1$ to $T_n$) so as to produce an image pickup signal output.

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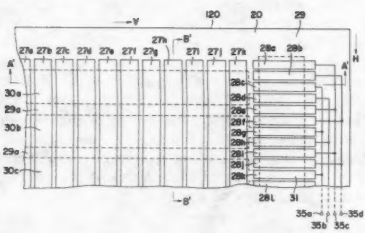
**4,591,917**

## SOLID STATE IMAGE SENSOR

**Nobuo Suzuki, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Oct. 6, 1983, Ser. No. 539,424**
**Claims priority, application Japan, Oct. 7, 1982, 57-176663**
**Int. Cl.⁴ H04N *3/15***
**U.S. Cl. 358—213** **11 Claims**



1. A solid state image sensor in which charge transfer channels are formed below an array, said array comprising an alternating succession of first and second transfer electrodes of a plurality of transfer electrodes aligned in a first direction, on a semiconductor wafer through an insulating film, the charge transfer channels allowing signal charges produced as an output of photoelectric converting means responsive to optical irradiation to be transferred to signal readout means having a first side adjacent to the transfer electrode array for defining the charge transfer channels to output the signal charges therefrom,

the improvement comprising means for controlling applied voltage, wherein:

(a) during optical irradiation of said photoelectric converting means, said applied voltage controlling means applies a voltage to form a deep potential well in a transfer channel below said first electrodes, and to form a potential barrier in a transfer channel located below said second electrodes, thereby to store signal charges in said potential well, and

(b) during reading out of said signal charges by means of signal readout means after illumination of said photoelectric converting means, said applied voltage control means applies a charge transfer multi-phase clock to a pair of first and second transfer electrodes adjacent to the signal readout means and sequentially applies a charge transfer multi-phase clock to each successive pair of first and second transfer electrodes, to effect a readout.

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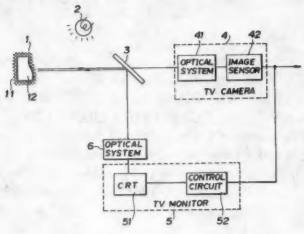
**4,591,918**

## IMAGE SENSOR SYSTEM

**Atushi Hisano, Nagaokakyo, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed Apr. 18, 1984, Ser. No. 601,530**
**Claims priority, application Japan, Apr. 18, 1983, 58-67977**
**Int. Cl.⁴ H04N *5/225, 5/30***
**U.S. Cl. 358—225** **2 Claims**




1. An image sensor system, comprising:

image sensing means for producing an image signal by sensing a field of view,

means for reproducing an image of the field by receiving the picture signal from the image sensing means, and

optical projection means for forming an optical image of the image of the field reproduced by the image reproducing means, at the same size as and in registration with the field itself and illuminating the field.

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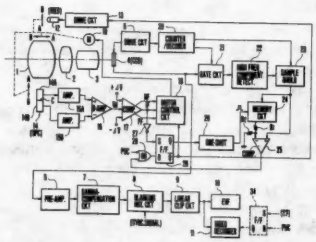
**4,591,919**

## AUTOMATIC FOCUS CONTROL SYSTEM AND CAMERA USING SAME

**Naoya Kaneda, Kanagawa; Masamichi Toyama; Susumu Kozuki, both of Tokyo; Yutaka Kohtani, and Akihiro Fujiwara, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 27, 1983, Ser. No. 536,369**
**Claims priority, application Japan, Sep. 30, 1982, 57-171923**
**Int. Cl.⁴ H04N *5/232;* G01J *1/20, 1/36;* G03B *13/18***
**U.S. Cl. 358—227** **32 Claims**



1. An automatic focus control system for a focus adjustable optical means, comprising:

(A) automatic focusing means of active type for automatically focusing said optical means relative to an object, said focusing means producing a first characteristic signal when the optical means reached an in-focus state relative to the object;

(B) detecting means for producing a second characteristic signal when said optical means became in an out-of-focus state after the optical means has been adjusted in the in-focus state; and

(C) control means responsive to said first and second characteristic signals for causing, in response to said first charac-

teristic signal, said focusing means to stop its operation and for causing, in response to said second characteristic signal, the focusing means to restart its operation.

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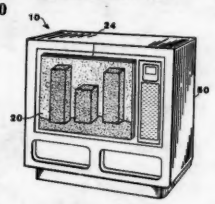
**4,591,920**

## PASSIVE IMPLEMENT FOR CONVERTING A TELEVISION RECEIVER TO AN OPTICAL-ART DISPLAY

**Toyohiko Yano, 3-19-4 Akasaka, Minato-Ku, Tokyo 107, Japan**

**Filed Oct. 20, 1983, Ser. No. 543,765**
**Int. Cl.[4] H04N *5/72***
**U.S. Cl. 358—250** **7 Claims**




1. A passive implement for converting a television receiver to an optical-art display comprising:
(a) a perforated-art panel having a multiplicity of apertures where said apertures, in combination, depict an artistic scene,
(b) a television receiver having a television screen,
(c) a panel frame assembly consisting of a front frame member and a back frame member where the frontside of the back frame member has a plurality of spaced pins and with the backside of the front frame member having an equal plurality and spacing of press-fit pin bores such that when said perforated-art panel is placed between the two frames and the two frames are press-fitted said panel is firmly held in-place, and
(d) means for attaching said panel frame assembly near the surface of the television screen.

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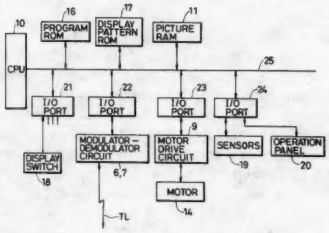
**4,591,921**

## FACSIMILE DEVICE

**Toshifumi Nakajima, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 22, 1983, Ser. No. 516,441**
**Claims priority, application Japan, Aug. 5, 1982, 57-135756**
**Int. Cl.[4] H04N *1/32***
**U.S. Cl. 358—257** **8 Claims**




1. A facsimile apparatus, comprising:
(a) memory means for storing therein a plurality of display patterns for contents of a plurality of extraordinary conditions;
(b) detection means for detecting the extraordinary conditions;
(c) recording means for recording received image information on a recording medium; and
(d) control means for reading out of said memory means, upon detection of one of the plurality of the extraordinary conditions during data reception, one of the plurality of the display patterns corresponding to the detected extraordinary condition and recording the read display pattern on the recording medium.

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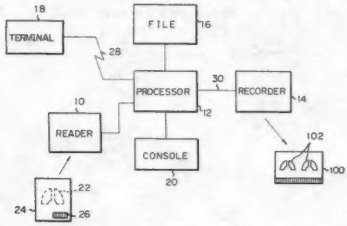
**4,591,922**

## RADIATION IMAGE REPRODUCING APPARATUS

**Masao Takano, and Eiichi Asai, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Aug. 8, 1983, Ser. No. 521,285**
**Claims priority, application Japan, Aug. 9, 1982, 57-137347**
**Int. Cl.[4] H04M *1/40***
**U.S. Cl. 358—280** **7 Claims**




1. A radiation image reproducing apparatus comprising:
reading means for sensing a radiation image stored in a first recording medium;
processor means interconnected to said reading means for performing image processings on the radiation image sensed by said reading means;
recording means interconnected to said processor means for recording the radiation image processed by said processor means on a second recording medium as a visible image; and
input means interconnected to said processor means for receiving direction data indicative of a direction of an exposure in which direction the radiation image is recorded on the first recording medium;
said processor means being operative in response to the direction data indicative of one direction, which is opposite to a usual direction of object observation, to record the radiation image on the second recording medium with the direction thereof inverted with respect to right and left.

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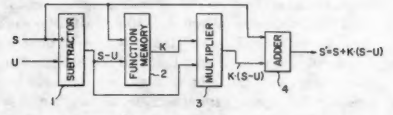
**4,591,923**

## METHOD AND APPARATUS FOR INTENSIFYING SHARPNESS OF PICTURE IMAGES

**Hitoshi Urabe, and Hideaki Kimura, both of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Sep. 5, 1984, Ser. No. 647,828**
**Claims priority, application Japan, Sep. 5, 1983, 58-162951**
**Int. Cl.[4] G03F *3/08*; H04N *1/40***
**U.S. Cl. 358—284** **5 Claims**




1. In a method for intensifying sharpness of a picture image to be processed of the type comprising the steps of forming a sharp signal and an unsharp signal from a signal representing

an image, multiplying an edge signal which is the difference between said sharp signal and said unsharp signal by a coefficient for determining degree of sharpness intensification to obtain an image sharpness intensifying signal, and adding said sharp signal to said image sharpness intensifying signal to perform a sharpening process of the picture image, the improvement in which said coefficient is processed as a function of said sharp signal and said edge signal.

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**4,591,924**

## MULTIPLEX MAGNETIC RECORDING AND REPRODUCTION SYSTEM

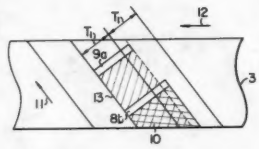
**Kuniaki Miura, Ibaraki; Yoshinori Okada, Katsuta; Isao Fukushima, Katsuta, and Teizo Tamura, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 31, 1984, Ser. No. 575,665**

**Claims priority, application Japan, Feb. 2, 1983, 58-14501**

**Int. Cl.[4] H04N** *9/80*

**U.S. Cl. 358—330** **16 Claims**




1. A magnetic recording and reproduction system of a helical scan type capable of recording and reproducing a plurality of information signals with a rotary magnetic head unit and operable selectively in a first operation mode in which a magnetic recording medium is transported at a standard speed for a recording and reproducing operation and a second operation mode in which the magnetic recording medium is transported at a lower speed as to obtain a longer recording and reproducing time than in said first operation mode using a same length of recording medium, comprising:

a first pair of rotary magnetic heads having different azimuth angles of gaps and disposed with an angular spacing of about 180 degrees from each other, said first pair of rotary magnetic heads being supplied with a first information signal for recording; and

a second pair of rotary magnetic heads having azimuth angles of gaps different from each other and from said first pair of rotary magnetic heads and disposed with an angular spacing of about 180 degrees from each other, said second pair of rotary magnetic heads being supplied with a second information signal having different major frequency components from those of said first information signal, said first and second pairs of rotary magnetic heads being disposed in the axial direction of rotation with an offset therebetween such that a pattern of record produced in recording by each of said first pair of rotary magnetic heads is at least partly overlaid by a pattern of record produced in recording by a corresponding one of said second pair of rotary magnetic heads, and, in said first operation mode, a large difference of azimuth angles of any one of said first pair of rotary magnetics heads and the corresponding one of said second pair of rotary magnetic heads is produced on substantially overlapping scanning tracks of said ones of said first and second pairs of rotary magnetic heads, and, in said second operation mode, a small difference of azimuth angles of any one of said first pair of rotary magnetic heads and the corresponding one of said second pair of rotary magnetic head is produced on substantially overlapping scanning tracks of said ones of said first and second pairs of rotary magnetic heads.

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**4,591,925**

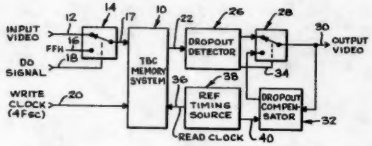
## ENCODED DROPOUT COMPENSATOR SYSTEM

**David E. Trytko, Foster City, Calif., assignor to Ampex Corporation, Redwood City, Calif.**

**Filed Apr. 6, 1983, Ser. No. 483,060**

**Int. Cl.[4] H04N** *9/491, 5/782*

**U.S. Cl. 358—336** **24 Claims**




1. A system for compensating dropouts in a given signal converted to a stream of digital data samples, comprising:

means for supplying a unique dropout sample indicative of the occurrence of an incorrect digital data sample corresponding to a dropout;

memory means for storing the unique dropout sample within the stream of digital data samples;

means for detecting the unique dropout sample during read out from the memory means of the combined stream of stored digital data and dropout samples; and

means responsive to the detecting means for replacing the unique dropout sample with a selected valid digital data sample.

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**4,591,926**

## TECHNIQUE FOR EDITING INTERLEAVED DIGITAL AUDIO DATA

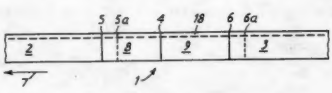
**Philip S. Gaskell, London, England; Roger Lagadec, Rumlang, Switzerland, and Guy W. W. McNally, Shere, England, assignors to Willi Studer AG, Regensdorf, Switzerland**

**Filed Aug. 24, 1984, Ser. No. 644,203**

**Claims priority, application United Kingdom, Aug. 26, 1983, 8323111**

**Int. Cl.[4] G11B** *27/02*

**U.S. Cl. 360—13** **24 Claims**




1. A method of editing digital audio data on a magnetic tape characterised in that the edited tape is provided at each edit with coded information identifying a first edit point up to which lead-in material is to be replayed, and a second edit point spaced from the first edit point and from which lead-out material is to be replayed, and in that unwanted lead-in and/or lead-out material is recorded in the space between the first and second edit points.

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**4,591,927**

## MAGNETIC TAPE HAVING MULTIPLE TRACKS AND RECORDING APPARATUS THEREFOR

**Isao Owaki, Tokyo, and Susumu Saito, Sagamihara, both of Japan, assignors to Victor Company of Japan, Ltd., Yokahama, Japan**

**Filed Dec. 5, 1983, Ser. No. 558,152**

**Claims priority, application Japan, Dec. 9, 1982, 57-216189**

**Int. Cl.[4] G11B** *5/86*

**U.S. Cl. 360—15** **5 Claims**

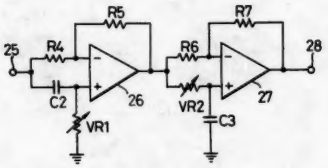
1. A recording apparatus for recording digital signals on one

or a plurality of forward recording tracks and one or a plurality of reverse recording tracks of a magnetic tape, the digital signals being reproduced from said one or plurality of forward recording tracks when the magnetic tape travels in a direction from one end to another end thereof, the digital signals being reproduced from said one or plurality of reverse recording tracks when the magnetic tape travels in a direction from said other end to said one end thereof, said recording apparatus comprising:

first one or a plurality of heads for making contact with the magnetic tape and for forming said one or plurality of forwarding recording tracks;

second one or a plurality of heads for making contact with the magnetic tape and for forming said one or plurality of reverse recording tracks, both of said first and second one or plurality of heads being supplied with the digital signals which are obtained by subjecting analog information signals to a digital pulse modulation;

means for moving the magnetic tape in a predetermined direction, said digital signals being simultaneously recorded on said one or plurality of forward recording tracks and said one or plurality of rreverse recording tracks by the respective first and second one or plurality of heads as the magnetic tape travels in said predetermined direction; and phase compensation circuit means for relatively advancing the phase of the digital signals which are recorded on first one or a plurality of recording tracks among said one or plurality of forward and reverse recording tracks with respect to the phase of the digital signals which are recorded on second one or a plurality of recording tracks among said one or plurality of forward and reverse recording tracks, so that solitary reproduced waveforms which are reproduced from said first one or plurality of recording tracks and solitary waveforms which are reproduced from said second one or plurality of recording tracks respectively have substantially the same assymmetry of zeros or the same symmetry of zeros, said first one or plurality of recording tracks being scanned upon reproduction in a direction opposite to said predetermined direction in which said magnetic tape traveled upon recording, said second one or plurality of recording tracks being scanned upon reproduction in a direction which is the same as said predetermined direction in which said magnetic tape traveled upon recording.




**4,591,928**

## METHOD AND APPARATUS FOR USE IN PROCESSING SIGNALS

**Phillip J. Bloom, and Garth D. Marshall, both of London, England, assignors to Wordfit Limited, London, England**

**PCT No. PCT/GB83/00087, § 371 Date Nov. 22, 1983, § 102(e) Date Nov. 22, 1983, PCT Pub. No. WO83/03483, PCT Pub. Date Oct. 13, 1983**

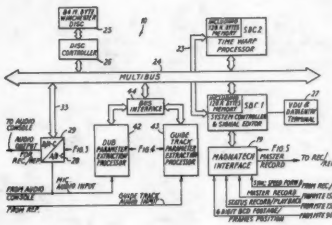
**Continuation of Ser. No. 586,226, Nov. 22, 1983, abandoned.**

**This PCT application Mar. 23, 1983, Ser. No. 736,407**

**Claims priority, application United Kingdom, Mar. 23, 1982, 8208376**

**Int. Cl.[4] G11B *5/09, 27/02***

**U.S. Cl. 360—13** **10 Claims**



1. A method for use in editing speech, the method being characterised by the following steps:

producing digital data representative of a second speech signal which is substantially imitative of a first speech signal;

processing the said signals to determine therefrom the occurrence and/or value of selected time-varying parameters of the first and second signals;

generating digital data representative of presence and absence of speech in the second signal, in response to processed digital data representative of the occurrence and/or value of selected time-varying parameters in the secocd signal;

generating digital data representative of pitch in the second signal;

utilizing the sequences of digital data representative of presence and absence of speech in the second signal and representative of time-varying parameters of the first and second speech signals to generate digital data representative of difference between the timing of characteristic features of the second speech signal and the timing of the corresponding characteristic features of the first speech signal; and

processing the digital data representative of pitch and the said difference in timing and the sequence of digital data representative of presence and absence of speech in the second speech signal and the said digital data corresponding to the second speech signal so as to generate editing data in accordance with a requirement to substantially replicate with the said characteristic features of the second speech signal the timing of the corresponding characteristic features of the first speech signal by adjusting the durations of silence and/or speech in the second speech signal.

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**4,591,929**

## INTERACTIVE LEARNING PROGRAMMING AND LIKE CONTROL CIRCUITRY

**Harley M. Newsom, 115 Via Santa Maria, Los Gatos, Calif. 95030**

**Filed Jul. 13, 1984, Ser. No. 630,521**

**Int. Cl.[4] G11B *5/00*; G09B *50/004***

**U.S. Cl. 360—32** **20 Claims**

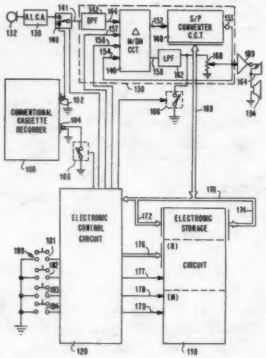
1. Electronic data storing and retrieving apparatus for operation in conjunction with an analog magnetic tape recording and reproducing device of the type having external electromagnetic transducer connecting terminals and having external operating switch connecting terminals,

said apparatus comprising the combination of

a reversible analog-to-digital data converting circuit, adapted for connection to said transducer connecting terminals, arrangements having analog signal input terminals of said magnetic recording and reproducing device, having analog signal output terminals, and having digital data bus terminals,

an electronic digital data storage circuit having digital data bus terminals connected to said converting circuit, and having control electric level input terminals,

an electronic control circuit arrangements having digital data bus terminals connected to said storage circuit arrangement, electric control level output terminals connected to the control level input terminals of said storage circuit, and having operator control switch input terminals, and




a bank of operator control switches connected to said electronic control circuit switch input terminals of said electronic control circuit arrangement,

said converting circuit arrangements comprising

a reversible delta modulator/demodulator circuit having analog signal input terminals adapted for connection to the analog signal input terminals of the converting circuit arrangement, analog signal output terminals for connecting to a monitoring device, digital data output terminals, and serial digital input terminals, and

a series/parallel converting circuit having a digital input terminal connected to the digital output terminal of said delta modulator/demodulator circuit, a series digital output terminal connected to the digital data input terminal of said modulator/demodulator circuit, and parallel digital data bus terminals.

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**4,591,930**

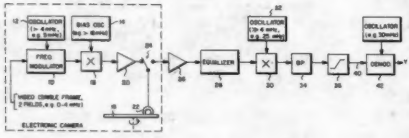
## SIGNAL PROCESSING FOR HIGH RESOLUTION ELECTRONIC STILL CAMERA

**Hans-Peter Baumeister, Churchville, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 23, 1983, Ser. No. 535,447**

**Int. Cl.[4] H04N *5/92***

**U.S. Cl. 360—35.1** **9 Claims**




1. Magnetic recording playback apparatus comprising:

(a) means for producing a bias-recorded frequency modulated video signal comprised of the lower side band and all or substantially all of the upper side band of such signal, the bias of such bias-recorded signal being substantially uniform as a function of frequency

(b) means for receiving and linearly processing said signal,

(c) means for limiting amplitude excursions of signals applied thereto,

(d) means for receiving and up-converting said linearly processed double side band frequency modulated signal, and for applying said up-converted frequency modulated signal to said means for limiting, the amount of up-conversion provided by said means for up-converting being sufficient to provide spectrum-wise disparity between the side bands of harmonics caused by said means for limiting and the spectrum of said up-converted frequency modulated signal, and

(e) means for filtering away the side bands of said harmonics.

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**4,591,931**

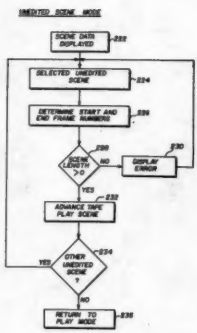
## PLAYBACK APPARATUS

**Hans-Peter Baumeister, Churchville, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 5, 1985, Ser. No. 720,315**

**Int. Cl.[4] G11B *15/18, 27/02***

**U.S. Cl. 360—72.1** **6 Claims**




1. The invention comprising:

playback means for playing back from recording media recorded information which includes both preselected segments and unpreselected segments;

identification means for identifying the start and end of preselected segments recorded on said media;

means for designating an unpreselected segment for playback; and

control means (1) for determining from said start and end identification means of said preselected segments the start and end of said designated unpreselected segment; and (2) for causing said playback means to play back said designated unpreselected segment.

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**4,591,932**

## AUTO-REVERSE MECHANISM FOR TAPE RECORDERS

**Tetsuo Aratani, Kakuda, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed Sep. 30, 1982, Ser. No. 431,123**

**Claims priority, application Japan, Dec. 18, 1981, 56-188959[U]**

**Int. Cl.[4] G11B *15/02, 15/48***

**U.S. Cl. 360—74.1** **6 Claims**

1. An auto-reverse mechanism for a tape recorder comprising:

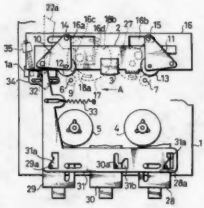
a pair of pinch rollers selectively movable against an associ-

ated capstan for running a tape respectively in one direction or the other;

a switching plate for selectivly moving said pinch rollers to switch the running direction of the tape;

a fast forward lever and a rewinding lever selectively operable to effect fast forwarding or rewinding, respectively, of the tape, each said lever having locking means thereon;

a lock plate having locking sections engageable by said locking means, respectively, for sliding said lock plate to a detent position and thereby retaining said locking means so as to lock a respective lever upon operation thereof, said lock plate being further movable to a release position so as to unlock the respective lever;



a reverse gear for operating both said switching plate and said lock plate in a selected sequence having first and second guide portions defined by cam protrusions and a switching pin for engaging said switching plate;

a cam plate having first means for imparting an initial rotation to said reverse gear and for selectively engaging said first and second guide portions, and second means including a drive member for sliding said lock plate to the release position to unlock the fast forwarding or rewinding lever when said first means engages said first guide portion of said reverse gear, and for not sliding said lock plate when said first means engages said second guide portion of said reverse gear.

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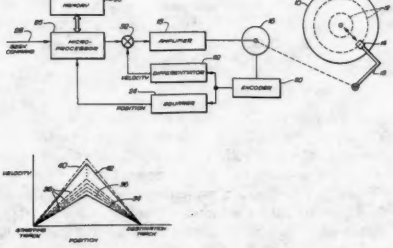
**4,591,933**

## DISK DRIVE HEAD POSITIONER WITH OPTIMIZED SEEK OPERATION

**James E. Quackenbush, Canoga Park, Calif., assignor to Computer Memories, Incorporated, Chatsworth, Calif.**

**Filed Nov. 28, 1983, Ser. No. 555,375**
**Int. Cl.[4] G11B *5/55***
**U.S. Cl. 360—78** **12 Claims**



**1.** In a disk drive system in which a transducer is moved between data tracks during seek operations in accordance with velocity profiles containing velocity commands corresponding to the distance from a destination track during each seek operation, the method for minimizing seek time comprising the steps of:

determining a velocity profile for each seek distance prior to each time the disk drive system is to be operated; and

operating the disk drive in accordance with the determined velocity profiles.

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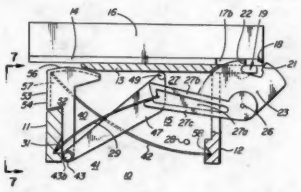
**4,591,934**

## CARTRIDGE LATCHING MECHANISM

**Dewey M. Sims, Jr., Wayne, Mich., assignor to Northern Telecom Limited, Montreal, Canada**

**Filed Nov. 24, 1982, Ser. No. 444,478**
**Int. Cl.[4] G11B *17/00, 23/02;* G03B *1/04***
**U.S. Cl. 360—93** **2 Claims**



**1.** A latching mechanism for latching a cartridge into a holder, said mechanism comprising:

a camming member situated so as to be able to engage a notch in said cartridge;

said camming member having a first surface contacted by the forward edge of the cartridge both during the insertion of said cartridge and during the discharge of said cartridge, and a second surface for engaging said notch in said cartridge so as to urge said cartridge into said holder, thereby providing the latching function;

said camming member being pivoted about a pivot point and having a first stable position and a second stable position;

a first buckling column spring having one end secured to a lever arm protruding from said camming member and having its other end fixed such that said first buckling column spring biases said camming member to its first stable position when there is no cartridge in said holder and biases said camming member to its second stable position when a cartridge is properly positioned in said holder;

said latching mechanism further including a release mechanism comprising:

a pivoted member which selectively contacts said lever arm of said camming member so as to force said camming member from said second stable position to said first stable position; and

a second buckling column spring having one end secured to said pivoted member and having its other end fixed such that said second buckling column spring biases said pivoted member away from said lever arm of said camming member.

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**4,591,935**

## IDLER DRIVE MECHANISM WITH POSITIONAL CONTROL

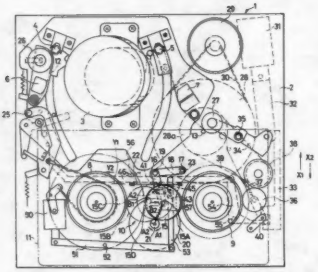
**Kazuo Kouda, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Japan**

**Filed Jul. 30, 1982, Ser. No. 403,345**
**Claims priority, application Japan, Jul. 31, 1981, 56-114172[U]; Jul. 31, 1981, 56-114173[U]**
**Int. Cl.[4] G11B *15/28***
**U.S. Cl. 360—96.3** **12 Claims**

**1.** An idler drive mechanism in a magnetic tape recording apparatus having supply and takeup reel discs, the magnetic tape recording apparatus being operable in forward and reverse search modes and recording and reproducing modes, said idler drive mechanism comprising:

a base;

a reversible motor mounted on said base;
a drive roller mounted on said base and rotatable by said motor;
an arm assembly pivotally mounted on said base;
an idler wheel rotatably supported on said arm assembly and selectively movably disposed between the supply and takeup reel discs, and said idler wheel being held in driven contact with said drive roller at all times and kept in a position spaced slightly from said takeup reel disc when in said recording or reproducing mode;
a slide lever slidably supported on said base and movable in



a first direction when in the forward or reverse search mode and in a second direction when in the recording or reproducing mode; and
a first spring operatively coupled between said arm assembly and said slide lever for urging said idler wheel from said position into driving contact with said supply or takeup reel disc dependent on the direction of rotation of said reversible motor when said slide lever is displaced in said first direction, said spring being releasable to a free state thereof when said slide lever is displaced in said second direction for thereby retracting said idler wheel away from said supply or takeup reel disc into said position.

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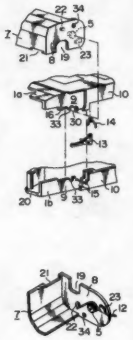
**4,591,936**

## TAPE CASSETTE PIVOTAL COVER LOCKING ARRANGEMENT

**Satoshi Kikuya, Katano; Seiko Minamide, Nara, and Narito Shibaike, Habikino, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Mar. 23, 1983, Ser. No. 478,208**
**Claims priority, application Japan, Mar. 23, 1982, 57-46668; Mar. 23, 1982, 57-41111[U]; Mar. 24, 1982, 57-47562; Apr. 2, 1982, 57-48498[U]; Jun. 30, 1982, 57-99909[U]**
**Int. Cl.[4] G11B *23/02, 23/04***
**U.S. Cl. 360—132** **4 Claims**

1. A tape cassette comprising;
a cassette case having upper and lower halves and side portions;
a front cover having side plate portions and pivot portions formed on said side plate portions through which said cover is pivotally supported to said case side portions so that said front cover is movable between a first pivoting position where said front cover covers a tape stretched along an opening formed in the front surface of said cassette case and a second pivoting position where the tape is uncovered, said front cover being formed with first and second engaging projections on one of said side plate portions;
a cover-locking piece adapted to be engaged with an engaging projection formed on said one side plate portion so that said cover-locking piece prevents said front cover from moving from said first pivoting position upon engagement of said cover-locking piece with its engaging projection;
a first urging means fitted onto one of said pivot portions which are formed on said one side plate portion for urging said front cover toward said first pivoting position,
said first urging means having opposite ends, both of said ends being retained by said first and second engaging projections respectively upon complete detachment of said front cover from said cassette case, while upon installation of said front cover onto said cassette case, one end



of said first urging means maintains its engagement with said second engaging projection, but the other end thereof is disengaged from said first engaging projection and then is engaged with said cassette case directly or indirectly through said cover-locking piece which therefore urges said front cover toward said first pivoting position; and
a second urging means for urging said cover-locking piece into engagement with its engaging projections.

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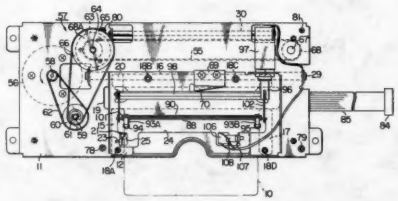
**4,591,937**

## HEAD MOUNTING ARRANGEMENT IN MAGNETIC CARD READER

**Masazumi Nakarai, Anjo, and Hitoshi Kamiya, Hekinan, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Mar. 8, 1983, Ser. No. 473,673**
**Claims priority, application Japan, Mar. 9, 1982, 57-37398**
**Int. Cl.[4] G11B *25/04, 3/40***
**U.S. Cl. 360—101** **14 Claims**



1. A magnetic card reader apparatus comprising:
guide means for defining a card passage adapted for the insertion of a magnetic card, provided with at least one elongated magnetic recording zone, for a predetermined distance in a direction which intersects the longitudinal direction of said magnetic recording zone, said guide means including pressing members for resiliently holding said magnetic card under spring force in a sandwiched manner within said card passage;
a magnetic head for transducing magnetically recorded information to an electrical signal by slidable movement relative to the magnetic recording zone of said magnetic card;
a movable assembly housing said magnetic head supported

by a pair of resilient pieces which extend in a slidably movement direction of said magnetic head, said pair of resilient pieces supporting at the center thereof said magnetic head so that a resilient force exerted by said pair of resilient pieces presses said magnetic head against said magnetic card in a perpendicular direction with respect to the surface of said magnetic card, said pair of resilient pieces having at free ends thereof respective rod-like elements;

a supporting assembly having a pair of supporting pieces for supporting said movable assembly pivotably at said rod-like elements in a both-end supporting fashion, said pair of supporting pieces supporting said magnetic head rotatably in a direction intersecting said slidable movement direction of the magnetic head, and said supporting assembly further including a pair of erected pieces positioned between said pair of supporting pieces for positioning said pair of supporting pieces and for restricting a rotational range of said magnetic head to a predetermined width;

auxiliary means for guiding the movement of said supporting assembly relative to said guide means such that said magnetic head is exposed to said card passage with the slidable movement direction of said magnetic head coinciding with the direction in which said recording zone extends and that said magnetic head is moved in said reading direction; and,

driving means for applying a driving power to said supporting assembly to thereby move said supporting assembly reversibly relative to said guide means.

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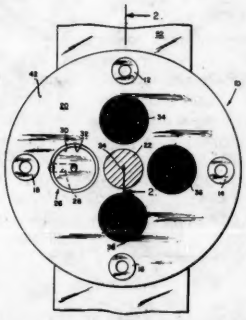
**4,591,938**

## METHOD AND APPARATUS FOR REMOVAL OF DUST FROM AN INFORMATION CARRIER DURING RECORDING AND PLAYBACK

**John H. Jacobs, Altadena, Calif., assignor to Bell & Howell Company, Skokie, Ill.**

**Filed Jan. 20, 1983, Ser. No. 459,404**
**Int. Cl.[4] G11B *00/00***
**U.S. Cl. 360—137** **39 Claims**



**1.** An apparatus for removing dust from an information carrier comprising:

a disc having at least one channel, each channel extending from a first planar surface of the disc to a second planar surface of the disc such that the distance from the intersection of each channel and the first planar surface to the axis of rotation of the disc is less than the distance from the intersection of each channel and the second planar surface to the axis of rotation of the disc; and

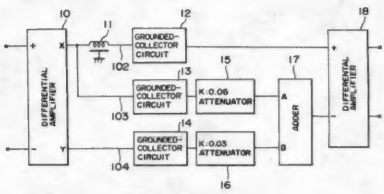
means for rotating the disc relative to the information carrier, about the axis with the second planar surface adjacent to the information carrier, to thereby cause air to flow through the channel onto the information carrier.

**4,591,939**

## WAVEFORM EQUIVALENT CIRCUIT

**Masashi Sakuma; Kazuo Nakagoshi; Kazuhisa Shiraishi, all of Odawara, and Shoji Ozaki, Kanagawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Oct. 24, 1984, Ser. No. 664,341**
**Claims priority, application Japan, Oct. 25, 1983, 58-199846**
**Int. Cl.[4] G11B *5/09, 15/14***
**U.S. Cl. 360—46** **7 Claims**




**1.** A waveform equivalent circuit for correcting the asymmetry of the rising and falling slopes of a first convex signal waveform comprising:

first means for delaying said first signal waveform by a time length of $\tau$ to produce a second waveform;

second means for producing a third signal waveform by adding said first signal waveform and a signal waveform derived from said first signal waveform, but delayed by a time length of $2\tau$;

third means for producing a fourth signal waveform by inverting said first signal waveform;

fourth means for producing a fifth signal waveform by attenuating said third signal waveform with a damping factor K1;

fifth means for producing a sixth signal waveform by attenuating said fourth signal waveform with a damping factor K2 larger than said damping factor K1;

sixth means for producing a seventh signal waveform by adding said fifth and sixth signal waveforms; and

seventh means for subtracting said seventh signal waveform from said second signal waveform.

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**4,591,940**

## SIGNAL QUALITY MONITOR FOR PROTECTIVE RELAY SYSTEM

**Shan C. Sun, Coral Springs, Fla., and James P. McGivern, Plum Boro, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Division of Ser. No. 397,753, Jul. 13, 1982, Pat. No. 4,524,446. This application Dec. 17, 1984, Ser. No. 682,403**
**Int. Cl.[4] H02H *3/00***
**U.S. Cl. 361—68** **18 Claims**

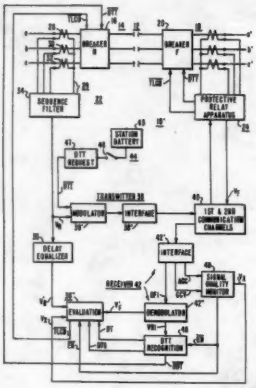
**1.** A protective relay system for providing protection for an alternating current transmission line section having at least first and second terminals for providing first and second protective relay signals, respectively, and including associated circuit breakers at said first and second terminals, said system comprising:

automatic gain control (agc) amplifier means having a signal receiving input connected to receive the first protective relay signal, a gain control input, and an output;

gain control means providing a unidirectional gain control signal for said gain control input, with the magnitude of said gain control signal being responsive to the output of said agc amplifier means, to maintain the output signal of said agc amplifier means substantially constant;

signal quality monitoring means including means for generating a first reference signal, first comparator means for comparing the magnitude of said gain control signal with said first reference signal to obtain an indication of whether or not the magnitude of the first protective relay

signal is within a predetermined range, noise means responsive to the output of the agc amplifier means for providing a noise signal having a magnitude responsive to the noise in the first protective relay signal, a second comparator means for comparing the magnitudes of said noise and gain control signals to obtain an indication of the signal-to-noise ratio of the first protective relay signal, and means for providing a disable signal when the quality of the first protective relay signal is below a predetermined level;



means for comparing said first and second protective relay signals and for providing a comparison signal in response to said comparison;

means for generating a second reference signal;

trip means for comparing said comparison signal with said second reference signal and for providing a trip signal for the circuit breaker associated with the second terminal; and

means responsive to said signal quality monitoring means for blocking a trip signal from tripping said associated circuit breaker when said signal quality monitoring means is providing said disable signal.

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**4,591,941**

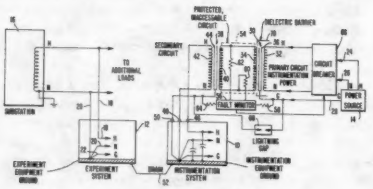
**DOUBLE INSULATED PROTECTED SYSTEM PROVIDING ELECTRICAL SAFETY AND INSTRUMENTATION QUALITY POWER GROUNDING**

**Michael E. Gruchalla, and David C. Koller, both of Albuquerque, N. Mex., assignors to EG&G Washington Analytical Services Center Inc., Albuquerque, N. Mex.**

**Filed Sep. 21, 1983, Ser. No. 534,205**

**Int. Cl.[4] H02H** *3/00*

**U.S. Cl. 361—42** **8 Claims**



1. A double insulated protected system for coupling an instrumentation system to a remote power source having power terminals and a ground terminal, for use in testing an experimental system, comprising:

a first isolating transformer having primary and secondary windings formed about a core, said primary winding being coupled to said power terminals of the remote power source, said core being coupled to said ground terminal, and said secondary winding being entirely decoupled from said ground terminal;

a second isolating transformer having primary and secondary windings formed about a core, said primary winding of said second transformer being coupled to said secondary winding of said first transformer and entirely decoupled from said ground terminal, and said instrumentation system being coupled to said secondary winding and core of said second transformer;

a drain conductor coupling said instrumentation system to said experimental system for referencing said instrumentation system to said experimental system; and

insulating means coupled to said first and second transformers for rendering inaccessible connections between said transformers.

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**4,591,942**

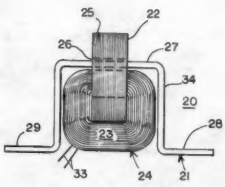
**CURRENT SENSING TRANSFORMER ASSEMBLY**

**Henry G. Willard, Wethersfield, Conn., and Thomas E. Anderson, Highland Heights, Ohio, assignors to General Electric Company, New York, N.Y.**

**Filed Dec. 7, 1984, Ser. No. 679,660**

**Int. Cl.[4] H02H** *3/08;* **H01F** *40/06*

**U.S. Cl. 361—97** **6 Claims**



1. A current transformer comprising:

a conductive primary strap having a U-shaped body inserted within a four-legged apertured magnetic cord; and

a secondary winding completely subjacent said U-shaped body and arranged around one of said four core legs for coupling magnetic flux between said primary strap and said secondary winding, said U-shaped primary strap having bight portion, said bight portion inserted within said aperture over said secondary winding, said U-shaped body encompassing three sides of said secondary winding.

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**4,591,943**

**APPARATUS FOR DEMAGNETIZING A CHUCK**

**Joseph A. Armond, River Forest, Ill., assignor to Electro-Matic Products Co., Chicago, Ill.**

**Filed May 26, 1983, Ser. No. 498,568**

**Int. Cl.[4] H01F** *13/00*

**U.S. Cl. 361—145** **4 Claims**

1. Apparatus for demagnetizing, comprising,

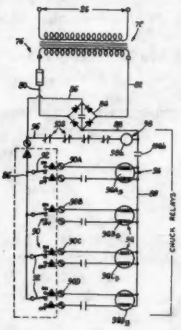
chuck means including a plurality of individual chucks,

first control means actuatable to energizing and de-energizing positions operative for placing the chucks in circuit and out of circuit, respectively,

magnetizing means operable, when energized, for magnetizing the chuck means,

demagnetizing means operable, when activated, for demagnetizing the chuck means,

second control means actuatable to selectively energize the magnetizing means and the de-magnetizing means, and



means preventing movement of the first control means to de-energizing position in response to said second control means being in energizing position.

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**4,591,944**

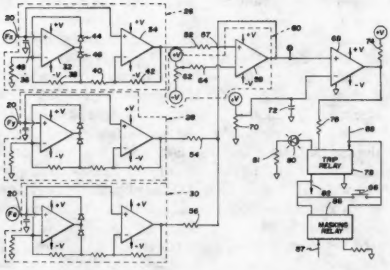
**ELECTRONIC CIRCUIT FOR TACTILE SENSORS**

**David P. Gravel, Allen Park, Mich., assignor to GMF Robotics Corporation, Troy, Mich.**

**Filed Sep. 10, 1984, Ser. No. 649,007**

**Int. Cl.[4] H01H *47/00***

**U.S. Cl. 361—170** **8 Claims**



1. An electronic circuit adapted to receive conditioned input signals from a 3-axis load cell mounted on the arm of a robot, the circuit providing a stop signal for use by a controller of the robot to prevent an overload condition, the circuit comprising:

computing means for computing the absolute value of each of the input signals;

adding means for adding the absolute values to obtain a resulting value;

comparing means for comparing the resulting value with a threshold value to obtain a trigger signal when the resulting value exceeds the threshold value; and

means responsive to said trigger signal to provide the stop signal.

**4,591,945**

**DEVICE FOR PROTECTING ELECTRONIC CIRCUITS AGAINST ELECTROSTATIC CHARGES**

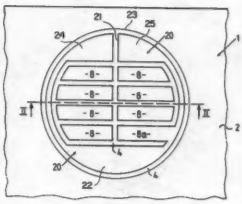
**Michel Ugon, Maurepas, France, assignor to Compagnie Internationale pour l'Informatique CII-Honeywell Bull (Societe Anonyme), Paris, France**

**Continuation of Ser. No. 596,078, Apr. 2, 1984, abandoned, which is a continuation of Ser. No. 367,937, Apr. 13, 1982, abandoned. This application Dec. 17, 1984, Ser. No. 682,584**

**Claims priority, application France, Apr. 30, 1981, 81 08717**

**Int. Cl.[4] G06K *7/08;* H05F *3/02***

**U.S. Cl. 361—212** **12 Claims**



1. In combination, electronic circuits, such as integrated circuits, mounted on an electrically insulating carrier element and a device for protecting the electronic circuits against damage due to electrostatic charges accumulating on the carrier element, said electronic circuits having fixed internal input/output contacts connected by an interconnecting net to external input/output terminals mounted on said carrier element, said terminals being accessible from the outside of the carrier element and concentrated in at least one zone of said carrier element, the device comprising at least one protective conductor element comprising a metal member having first and second ends closely spaced to one another to form a gap therebetween and being carried by said carrier element, the metal member being connected to ground and being mounted closely adjacent to and so as to surround said input/output terminals concentrated in said zone so as to prevent said electrostatic charges from reaching said terminals.

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**4,591,946**

**CAPACITANCE PROBE FOR USE IN A MEASURING SYSTEM FOR LOCATION OF A LIQUID LEVEL INTERFACE**

**Woodrow W. Pope, Garland, Tex., assignor to Southwest Pump Company, Plano, Tex.**

**Filed Apr. 30, 1985, Ser. No. 729,068**

**Int. Cl.[4] H01G *5/28;* G01F *23/26***

**U.S. Cl. 361—284** **10 Claims**

1. An elongated capacitance probe for use in a measuring system for locating a liquid level interface in a tank, comprising:

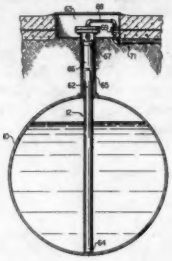
an outer casing having top and bottom ends defining a length thereof approximately equal to a height of said tank;

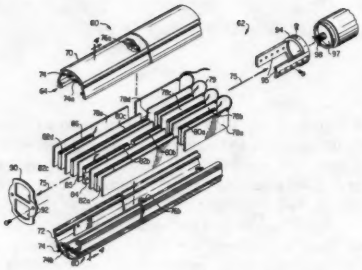
a plurality of spacers mounted in opposed relation in said outer casing to form spacer pairs, said spacer pairs located in a spaced apart relationship along a longitudinal axis of said outer casing;

a plurality of ground plates mounted in a spaced apart relationship in said spacer pairs; and

one or more capacitor plates mounted in said spacer pairs, each extending substantially the length of said outer cas-

ing and in combination with one of said ground plates forming a capacitor extending substantially the length of





said outer casing, for determining the location of said liquid level interface in said tank.

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**4,591,947**

## TUBULAR CAPACITOR AND METHOD OF MAKING

**Rodney D. Bagley, Big Flats, N.Y., and Andrew Herczog, Melbourne Beach, Fla., assignors to Corning Glass Works, Corning, N.Y.**

**Filed May 22, 1985, Ser. No. 736,812**
**Int. Cl.[4] H01G *1/14, 4/28***
**U.S. Cl. 361—310** **10 Claims**

1. A tubular capacitor comprising an outer dielectric cylinder, a plurality of radial dielectric walls extending inwardly from said outer cylinder, the spaces between said outer cylinder and said radial walls forming longitudinal passages, conductive electrodes on the outer and inner surfaces of said cylinder and on the surfaces of said radial walls, first electrical termination means connected to a plurality of said conductive electrodes, and second electrical termination means connected to the remainder of said conductive electrodes.

**4,591,948**

## OIL-FILLED CAPACITOR

**Atsushi Sato, Tokyo; Keiji Endo, Yokosuka; Shigenobu Kawakami, Ichikawa, and Hideyuki Dohi, Tokyo, all of Japan, assignors to Nippon Petrochemicals Company, Limited, Tokyo, Japan**

**Filed Aug. 6, 1985, Ser. No. 762,931**
**Int. Cl.[4] H01G *4/22, 4/32***
**U.S. Cl. 361—315** **4 Claims**

1. An oil-filled capacitor which is made by impregnating a film-wound capacitor element with 1-phenyl-1-(benzylphenyl)ethane, at least a part of the dielectric material of said capacitor element being made of a plastic film.

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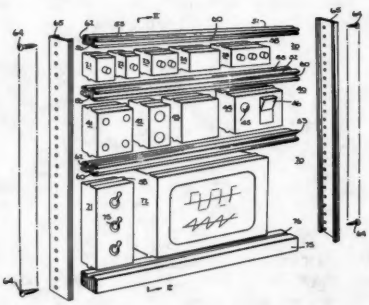
**4,591,949**

## MODULAR PATCHBOARD FOR ELECTRICAL DEVICES

**Roy J. Lahr, 944 Hammond St., Los Angeles, Calif. 90069**

**Continuation of Ser. No. 427,562, Jun. 29, 1982, abandoned.**
**This application Mar. 25, 1985, Ser. No. 715,593**
**Int. Cl.[4] H02B *1/04***
**U.S. Cl. 361—394** **9 Claims**



1. A modularized selectively alterable patchboard for electrical devices comprising:

a plurality of electrical connector rows, each row comprising a plurality of discrete modules, each module having two or more substantially parallel mounting edges, at least one module in each row having at least one electrical connector disposed between said substantially parallel mounting edges thereof;

a plurality of elongated rails slidably engaging said modules, at least one rail disposed between and aligned with a first electrical connector row and a second electrical connector row and having a first mounting surface which is aligned with and slidably engages one of the mounting edges of each of the modules in said first row and a second mounting surface which is aligned with and slidably engages one of the mounting edges of each of the modules in said second row;

a detachable connecting member holding the rails.

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**4,591,950**

## CIRCUIT BOARD-TERMINAL-HOUSING ASSEMBLY

**Grover K. Houpt, Wayne, Pa., assignor to American Manufacturing Company, Inc., King of Prussia, Pa.**

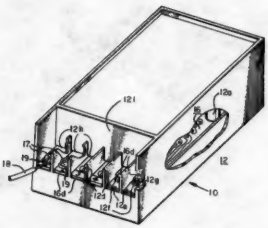
**Filed Sep. 9, 1983, Ser. No. 530,705**
**Int. Cl.[4] H05K *5/02***
**U.S. Cl. 361—399** **11 Claims**

1. Electromechanical apparatus comprising:

(a) a housing having a nonconductive external portion and an interior, said external portion having a wall with a selected number of first aligned apertures formed therein that bring the interior of said housing into communication with said external portion, said external portion also including a shelf-like planar part in which a selected number

of second apertures are formed for engagement by fastening means, and

(b) a circuit board member all of whose parts lie within a single plane mounted in said interior so that predetermined conductive portions thereof extend through said first apertures and overlie said planar part of said external portion in adjacent parallel relationship, said predetermined conductive portions being electrically coupled to predetermined electrical pathways on said member within said interior, said predetermined conductive portions also having a selected number of third apertures formed therein which are aligned with corresponding ones of said second apertures for engagement by fastening means inserted through said third apertures into said second apertures.



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**4,591,951**

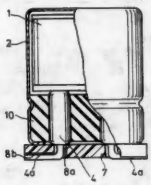
## MOUNTING ARRANGEMENT FOR ELECTRONIC COMPONENTS

**Shigeyoshi Iwamoto, Jyoyo; Yoshifumi Saeki, Hirakata; Takashi Kuribayashi, Yawata; Shinichiro Ishitsuka, Chitose, and Nobukuni Ogino, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Jul. 24, 1984, Ser. No. 633,889**

**Int. Cl.[4] H05K *1/18***

**U.S. Cl. 361—417** **10 Claims**



1. An electronic component comprising:

a case containing an electronic component element therein and having a sealing part wherein an opening of said case is sealed by calking the former thereby holding a sealing member through which lead wires are led out, and

an insulator base fixed abutted to said sealing part, and having at least one through-hole through which said lead wires are led out, and

lead wires which are led out through said through-hole, respective end parts of said wires being bent along the outside face of said insulator base.

**4,591,952**

## ELECTRICAL ELEMENT SUCH AS A TANTALUM AND SOLID-ELECTROLYTE CAPACITOR

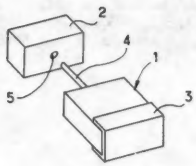
**Jean-Claude Asscher, Paris, France, assignor to Tekelec-Airtronic, France**

**Filed Aug. 17, 1984, Ser. No. 641,761**

**Claims priority, application France, Jan. 31, 1984, 84 01482**

**Int. Cl.[4] H01G *9/00, 7/00***

**U.S. Cl. 361—433** **10 Claims**



7. An electrical element such as a solid-electrolyte capacitor, including a body constituting an anode and metallic end-fitting constituting output electrodes, the anode end-fitting being welded on an anode wire projecting from said body, the anode wire and said body being made of a metal having a melting temperature higher than that of the metal of the anode end-fitting, wherein the anode end-fitting is constituted by a massive metallic element possessing sufficient thermal inertia to compensate for the difference in melting temperature of the materials constituting the anode end-fitting and the anode wire and wherein a spacer made of a dielectric material is interposed on the anode wire between the body and the anode end-fitting in the form of a block, the length of the spacer being variable to allow for obtaining of an assembly of desired length.

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**4,591,953**

## OPERATING THEATRE TABLE LIGHT

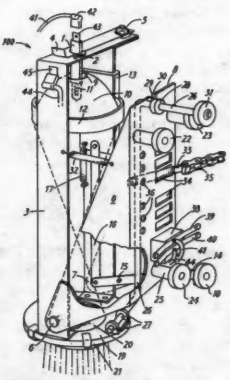
**John A. Oram, 243 Heath Road, Leighton Buzzard, Bedfordshire, England**

**Filed Apr. 26, 1983, Ser. No. 488,879**

**Claims priority, application European Pat. Off., Apr. 28, 1982, 82302194.4**

**Int. Cl.[4] A61G *13/00***

**U.S. Cl. 362—33** **24 Claims**



1. An operating theatre table light comprising a cluster of lamp units within a common housing and at least approximately equidistant from a central axis of the light, said lamp units being disposed and constrained to illuminate a common patch on said central axis, at least some of said lamp units of

said cluster being individually movable about said central axis, so that said cluster may be arranged in a variety of configurations while said lamp units remain disposed to illuminate said common patch.

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**4,591,954**

## LAMP DEVICE FOR A VEHICLE MOUNTED ON A REAR WINDOW OR THE LIKE

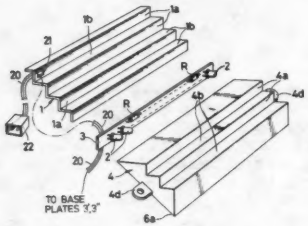
**Toshihide Kawamura, Yono; Hoichiro Kashiwabara, Hino; Osamu Waki, Mitaka, and Hiro Sakai, Atsugi, all of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan**

**Filed Apr. 2, 1985, Ser. No. 718,805**

**Claims priority, application Japan, Apr. 6, 1984, 59-50578[U]**

**Int. Cl.[4] B60Q *1/00***

**U.S. Cl. 362—61** **23 Claims**




1. A lamp device for projecting a light signal on a motor vehicle comprising:

a lamp base and a light-transmissive casing each in the shape of a stepped staircase having at least two adjacent steps, said adjacent steps being defined by at least one pair of alternating substantially horizontal and substantially vertical faces;

a plurality of light sources mounted on at least one of said substantially vertical faces of said lamp base for projecting a light signal outwardly from said at least one vertical face; and

said casing being mounted over said lamp base such that:

the substantially horizontal faces of said at least two adjacent steps of said casing are substantially parallel to the substantially horizontal faces of said at least two adjacent steps of said lamp base; and

the substantially vertical faces of said at least two adjacent steps of said casing are substantially parallel to the substantially vertical faces of said at least two adjacent steps of said lamp base and adjacent to said light sources which are mounted on said substantially vertical faces of said lamp-base;

means for energizing said light sources for generating a light signal from said light source; and

means for attaching said lamp device to said motor vehicle.

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**4,591,955**

## ILLUMINATING DEVICE PRODUCING A RIPPLE EFFECT

**Adam G. Kallay, 6075 Wilkinson Rd., Clinton, Wash. 98236**

**Filed Aug. 24, 1984, Ser. No. 643,777**

**Int. Cl.[4] F21V *33/00***

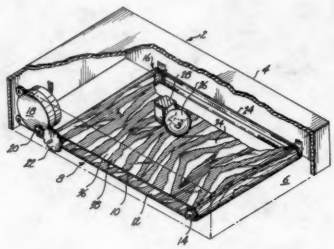
**U.S. Cl. 362—101** **11 Claims**

1. An illuminating device which comprises:

a. an endless belt-type pattern means, said means having a background portion of relatively lower light transmissivity with the remaining area of the pattern means being comprised of a multiplicity of geometric design areas of relatively higher light transmissivity;

b. drive means for the pattern means, said drive means comprising roller-type supporting means arranged to hold the pattern means in the form of a continuously moveable loop having generally parallel first and second face areas and further comprising motor means to drive the roller-type supporting means; and

c. a light source adjacent to the first face area of the pattern means whereby, when the pattern means is moved by the drive means, the geometric design areas on the first and second face areas will move past each other in opposite



directions and the light shining firstly through the moving geometric design areas of the first face area, and thence through the moving geometric design areas of the second face area, will project a continuously moving ripple effect pattern upon an illuminated zone, said illuminated zone being located beyond said second face area of said pattern means.

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**4,591,956**

## SUN VISOR FOR AUTOMOTIVE VEHICLES

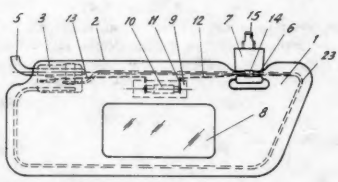
**Roland Majchrzak, Yutz, France, assignor to Gebr. Happich GmbH, Fed. Rep. of Germany**

**Filed Oct. 15, 1984, Ser. No. 660,935**

**Claims priority, application Fed. Rep. of Germany, Nov. 5, 1983, 3340068**

**Int. Cl.[4] F21V *33/00***

**U.S. Cl. 362—144** **14 Claims**




1. A sun visor for an automotive vehicle, comprising:

a visor body having opposite surfaces and having an upper longitudinal edge;

a source of light supported at one of the visor body surfaces; an electric current lead wire connectable with the electrical system of the vehicle and connected with the light source; a ground wire also connected with the light source;

a swivel bearing at the upper longitudinal edge of the body toward one side thereof; the swivel bearing comprising a bearing part of non-metallic material;

a borehole in the bearing part for receiving a visor support shaft; a plug opening in the bearing part for receiving a contact element; a passage channel inside the bearing part extending between the borehole and the plug opening;

an electrically conductive sun visor support shaft supported in the bearing borehole such that the visor body can swivel around the support shaft; one of the electric wires from the electric system of the vehicle being connected to the support shaft;

a contact element in the plug opening; a spring-loaded contact projection on the contact element, and the projection protruding slightly into the bearing borehole through the passage channel, whereby the contact projection is protected inside the bearing part as it projects into the bearing borehole.

the support shaft including a recess defined in it where the support shaft passes over the passage opening; the recess being deep enough that the contact projection does not contact the support shaft when the recess is over the contact projection.

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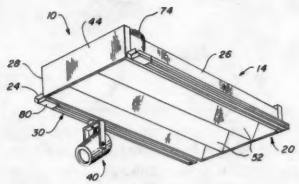
**4,591,957**

## LIGHTING DISTRIBUTION SYSTEM

**Ronald P. Harwood, 30733 W. Ten Mile Rd., Farmington Hills, Mich. 48024**

**Filed Aug. 21, 1985, Ser. No. 767,881**
**Int. Cl.[4] F21S *3/02***
**U.S. Cl. 362—148** **17 Claims**




1. In combination with a fluorescent lamp fixture including generally rectangular housing means for carrying a fluorescent lamp therewithin, and wire way means for carrying wires of said flourescent lamp fixture for connection to an electrical power supply,

lighting track means for supporting a track fixture at a selectable position along a lineal expanse of said track means,

attachment means for supporting said lighting track means adjacent said housing means to extend along a sidewall thereof,

said lighting track means including electrical conductor means for engaging a track fixture in electrical contact for delivering electrical power thereto,

wire means for connecting said electrical conductor means of said lighting track means to an electrical power supply for energizing a track fixture supported by and extending from said lighting track means.

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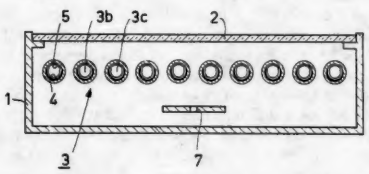
**4,591,958**

## ULTRAVIOLET IRRADIATION PANEL

**Theodorus F. Lamboo, Roosendaal, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jan. 10, 1984, Ser. No. 569,688**
**Claims priority, application Netherlands, Jan. 13, 1983, 8300115**
**Int. Cl.[4] H01J *61/35***
**U.S. Cl. 362—219** **10 Claims**




1. An ultraviolet irradiation device, comprising:

a housing having a front wall which is transparent to ultraviolet radiation,

a plurality of straight, circular tubular low-pressure mercury vapor discharge lamps disposed within said housing, parallel to each other, each lamp having an inner wall having an ultraviolet reflecting layer extending over the length of the lamp, said layer extending along part of the circumference of the lamp,

characterized in that said lamps are arranged in a planar array, spaced from each other such that the longitudinal axes of adjacent lamps are at a distance of from 1.01 to 1.20 times the outer diameter of the individual lamps, and

the respective reflecting layers extend symmetrically across that portion of the circumference of each lamp which is toward the rear of said housing, over at least 180° and not more than 240° of the tube circumference.

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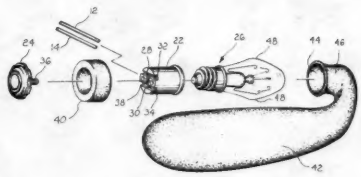
**4,591,959**

## DECORATIVE LIGHTING FIXTURE

**J. Stephen Kenyon, P.O. Box 717, 8 Leonard Rd., Enfield, Conn. 06082**

**Filed Nov. 29, 1984, Ser. No. 676,315**
**Int. Cl.[4] F21S *1/00***
**U.S. Cl. 362—252** **11 Claims**




1. A light fixture sub-assembly comprising:

(a) lamp socket means, said socket means including:

a cylindrical body portion having a first and second end;

means at said first end for receiving a light bulb; and,

means at said second end for effecting electrical connection to a power supply, said second end having a gas tight seal;

(b) balloon retaining means disposed on said cylindrical body portion of said lamp socket means, said balloon retaining means comprising a resilient sleeve disposed about the exterior of said cylindrical body portion so as to effect a gas tight seal therebetween; and

(c) an inflatable expandable balloon, said balloon having an open end for receiving gas, said open end leading to a collar portion; wherein said balloon is adapted to be placed over a light bulb which has been received in said receiving means; and wherein said collar portion of said balloon and said retaining means effects a substantially gas tight connection without contacting said light bulb.

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**4,591,960**

## LIGHTING OPTICAL SYSTEM

**Bill F. Jones, Orange, Calif., assignor to MWC Lighting, Fountain Valley, Calif.**

**Filed Oct. 2, 1984, Ser. No. 656,945**
**Int. Cl.[4] F21V *7/00***
**U.S. Cl. 362—298** **28 Claims**

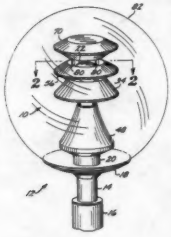
1. A reflector system for concentrating light emitted by a light source into a first directional range measured from downward vertical, and for providing decreasing intensity of projected light with changes in the angle of projection from the first directional range to downward vertical, said system comprising:

a lower reflector having an upward and outwardly facing concave reflecting surface;

a central reflector positioned above said lower reflector and

having planar inner and outer reflecting surfaces, said central reflector being situated to surround the light source to intercept all horizontally emitted light, redirect that intercepted light to said lower reflector which in turn concentrates that light into the first directional range measured from downward vertical, the spacing between said lower reflector and said central reflector creating a lower gap through which unreflected light can pass into a middle directional range having a greater downward slope than light projected into the first directional range;

an intermediate reflector positioned above said central reflector and having similarly curved, convex upper and concave lower surfaces, said intermediate reflector being situated to intercept a portion of the light emitted by the light source which is directed above said central reflector in a manner to prevent the escape of any unreflected light between said central and intermediate reflectors, and redirect that intercepted light to said planar outer reflecting surface of said central reflector which in turn reflects that light into the first directional range measured from downward vertical; and



an upper reflector positioned above said intermediate reflector and having a central, downwardly facing, planar reflecting surface, and a downward and outwardly facing, peripheral concave reflecting surface contiguously extending outwardly from said central reflecting surface, said upper reflector being situated to intercept all of the light emitted by the light source which is directed above said intermediate reflector in a manner to prevent the escape of any unreflected light between said upper and intermediate reflectors, said central reflecting surface redirecting a portion of the light intercepted by said upper reflector through said lower gap and into a lower directional range extending substantially from downward vertical up to said middle directional range, said peripheral concave reflecting surface redirecting the remainder of the light intercepted by said upper reflector through an upper gap between said upper and intermediate reflectors, the light passing through said upper gap being concentrated into the first directional range.

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**4,591,961**

## SHOCK-REDUCING LAMP ASSEMBLY FOR VEHICLES

**Sam A. Myles, Oak Park, and Paul C. Katz, Chicago, both of Ill., assignors to Triplex Manufacturing Co., Chicago, Ill.**

**Filed Aug. 9, 1985, Ser. No. 764,831**
**Int. Cl.[4] F21V *15/04***
**U.S. Cl. 362—390** **15 Claims**

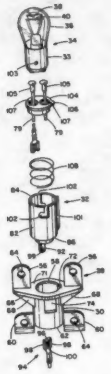
1. A shock-reducing lamp assembly adapted for mounting on a vehicle, said assembly comprising:

a housing defining a cavity having an open end;

a lens connected to said housing and closing said open end;

an integral resilient mount including a generally tubular central portion having a first end and a second end with a first pair of spaced mounting feet disposed adjacent said first end and a second pair of spaced mounting feet positioned adjacent said second end, each of said feet having a mounting aperture, said first pair of feet extending in a first plane and said second pair of feet extending in a second plane with said first and second planes being spaced and substantially parallel; and

a metallic socket for holding a lamp and telescopically received in said tubular central portion, said housing including mounting means for positioning said mount so that said lamp is in operative relationship to said lens, said mounting means comprising a plurality of pins extending toward said open end corresponding in number to said feet with a pin received in the aperture of each foot.



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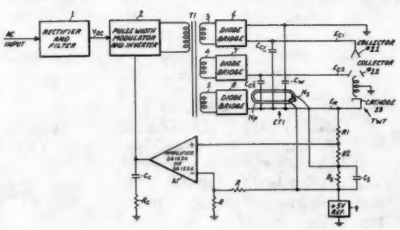
**4,591,962**

## REGULATED POWER SUPPLY FOR RAPID NO-LOAD TO FULL-LOAD TRANSITIONS

**Albrecht Schwarz, North Caldwell, and John D. Sosnowski, Roselle Park, both of N.J., assignors to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Dec. 16, 1983, Ser. No. 562,143**
**Int. Cl.[4] H02M *3/22***
**U.S. Cl. 363—15** **46 Claims**



1. A power supply for electronc equipment comprising:

first means to convert an alternating current voltage input to a direct current voltage;

second means coupled to said first means to convert said direct current voltage to a pulse width modulated voltage;

third means coupled to said second means responsive to said pulse width modulated voltage to produce at respective active outputs thereof N output direct current voltages, each having a different predetermined value, where N is an integer greater than one and a ground potential at an additional output thereof, and including N capacitors each connected between a single one of said active outputs and a different remaining output;

feedback means coupled between said one output of said third means and said second means to provide a substan-

tially constant value for said N output voltages when a varying load is presented to said power supply; and

current transformer means having an input portion interposed between each of said capacitors and said one active output and an output portion inductively coupled to said input portion and connected in series to said feedback means to provide wide bandwidth and low droop without oscillation for said power supply when a step load is presented to said power supply.

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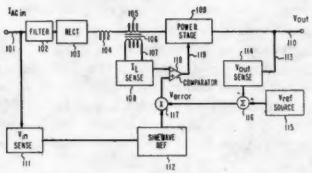
## 4,591,963

## TECHNIQUE FOR REDUCING LINE CURRENT HARMONICS AT INPUT TO POWER SUPPLY ACTING AS NONLINEAR LOAD

**Daniel D. Retotar, Randolph, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Apr. 23, 1984, Ser. No. 602,695**
**Int. Cl.[4] H02M 3/335**
**U.S. Cl. 363—17** **8 Claims**




1. A converter adapted for minimizing line frequency harmonic currents generated at a source of energy for a system comprising:

input means,

output means,

power switching apparatus interposed between the input means and the output means and including a plurality of switching devices connected in a bridge network,

inductive means for providing energy storage operating in a continuous current mode and coupled to supply current from the input means to the power switching apparatus,

means for generating a reference waveform in phase with and of similar wave shape to an energizing waveform at the input means,

means for generating an error voltage representative of a deviation of a voltage at the output means from a regulated value,

means for adjusting an amplitude of the reference waveform in response to the error voltage, and

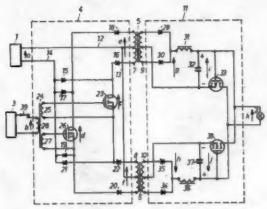
means for driving the power switching apparatus in response to the means for adjusting and operative for controlling a current waveform in the inductive means to substantially equal the shape of the reference waveform and, further, being operative to bias all switching devices conductive simultaneously to initiate current flow in the inductive means.

## 4,591,964

## METHOD OF SECURELY INTERRUPTING THE ELECTRIC POWER SUPPLY FROM A LOW-FREQUENCY OR DIRECT VOLTAGE SOURCE TO A LOAD, AND APPARTUS FOR CARRYING OUT THE METHOD

**Clas A. Kemstedt, Higersten, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden**

**PCT No. PCT/SE83/00023, § 371 Date Sep. 30, 1983, § 102(e) Date Sep. 30, 1983, PCT Pub. No. WO83/02860, PCT Pub. Date Aug. 18, 1983**
**PCT Filed Jan. 26, 1983, Ser. No. 540,369**
**Claims priority, application Sweden, Feb. 5, 1982, 8200666**
**Int. Cl.[4] H02M 3/335**
**U.S. Cl. 363—24** **2 Claims**



1. Method of reliably controlling the energizing of a load comprising providing a source voltage having a low frequency or direct-current voltage, controllably providing a chopping voltage having a frequency substantially greater than said low frequency, said chopping voltage being controllably switchable between on and off states, chopping said source voltage in response to said chopping voltage such that, when said chopping voltage is present, a high-frequency voltage is generated, inductively coupling said high-frequency voltage to an output circuit containing said load solely through a high-frequency path with galvanic isolation and rectifying and filtering the high-frequency voltage induced in said output circuit such that when the chopping voltage is in on state the load will be supplied with voltage corresponding to voltage from said source whereas when the chopping voltage is in off state no leakage voltage can be transmitted across said inductive coupling and there will be no voltage at said load whereby to reliably interrupt supply of voltage to said load and when the source voltage has a low frequency, the voltage applied to the load has substantially the same waveform as the source voltage.

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## 4,591,965

## INVERTER FOR USE WITH SOLAR ARRAYS

**Arthur F. Dickerson, 245 Hacienda Ave., San Luis Obispo, Calif. 93401**

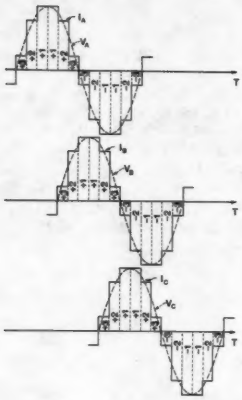
**Filed Oct. 19, 1984, Ser. No. 662,783**
**Int. Cl.[4] H02M 1/12**
**U.S. Cl. 363—43** **16 Claims**

1. In a system for generating an N phase alternating electric current by using switching means controlled by a controller to intermittently connect a number M of solar arrays (listed in order of decreasing output voltage as $D_1, D_2, \ldots D_i \ldots D_M$) to the lines $L_1, L_2, \ldots L_k \ldots L_N$ where N is an odd number equal to or greater than M, the improvement comprising:

control means for controlling the switching means to connect $D_i$ to $L_k$ in a positive sense for an interval of duration 90°/N beginning at

$$90^\circ\left(1-\frac{i}{N}\right)+(k-1)\frac{360^\circ}{N}+\delta$$

and again at



-continued

$$90^\circ\left(1+\frac{i-1}{N}\right)+(k-1)\frac{360^\circ}{N}+\delta$$

where $\delta$ any constant angle, and for controlling the switching means to connect $D_i$ to $L_k$ in a negative sense for an interval of duration $90^\circ/N$ beginning at

$$90^\circ\left(3-\frac{i}{N}\right)+(k-1)\frac{360^\circ}{N}+\delta$$

and again at

$$90^\circ\left(3+\frac{i-1}{N}\right)+(k-1)\frac{360^\circ}{N}+\delta$$

for all values of i and k, where $1<i\leqq M$ and $1<k\leqq N$, whereby at any particular instant no more than one array is feeding a particular line, and whereby each array is utilized 100% of the time.

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**4,591,966**

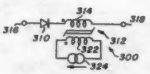
**RECTIFYING NETWORK**

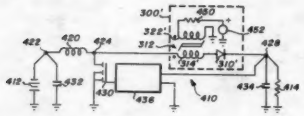
**Steve Smith, 5100 Channel Ave., Richmond, Calif. 94804**

**Filed May 19, 1983, Ser. No. 495,970**

**Int. Cl.[4] H02P *13/24***

**U.S. Cl. 363—91** **14 Claims**





**1**. A rectifying network comprising in combination:

a pair of terminals;

a diode;

a saturable reactor including a core and a first winding would on said core, said first winding being connected in series with said diode between said terminals; and

means for biasing said core into saturation for forward diode current flow.

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**4,591,967**

**DISTRIBUTED DRUM EMULATING PROGRAMMABLE CONTROLLER SYSTEM**

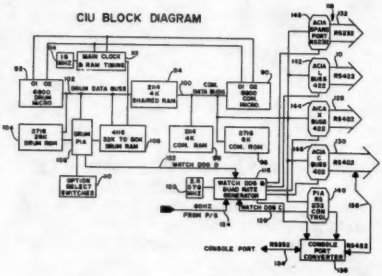
**Donald A. Mattes, Lincoln, Mass.; Steven G. Landry, Litchfield, and James M. Kendall, Nashua, both of N.H., assignors to Andover Controls Corporation, Andover, Mass.**

**Continuation of Ser. No. 393,471, Jun. 29, 1982, abandoned.**

**This application Jul. 25, 1985, Ser. No. 758,840**

**Int. Cl.[4] G06F *15/46, 15/16***

**U.S. Cl. 364—132** **32 Claims**




**1**. A programmable controller system comprising:

a plurality of central processing units;

a data exchange bus interconnecting each of said central processing units for the transmission and receipt of data between all of said central processing units;

each of said central processing units being adapted to transmit preselected data assigned to said unit to each of said other central processing units along said data exchange bus;

each of said central processing units including a memory for storage of data;

said memory in each of said central processing units being adapted to store all preselected data assigned to that unit and all data transmitted by each of said other units along said data exchange bus such that all of said preselected data assigned to each of said plurality of units is stored in every one of said units.

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**4,591,968**

**NUMERICAL CONTROL METHOD**

**Ryoichiro Nozawa, Tokyo; Hideaki Kawamura, and Mitsuto Miyata, both of Hachioji, all of Japan, assignors to Fanuc Ltd., Hino, Japan**

**Filed Apr. 1, 1983, Ser. No. 481,249**

**Claims priority, application Japan, Apr. 7, 1982, 57-57714**

**Int. Cl.[4] G05B *19/18;* G06F *15/46***

**U.S. Cl. 364—167** **5 Claims**

**4**. A numerical control method using a processor and a G-code memory to execute numerical control instructions including G-code instructions having a G-code label, a numerical value and a code, said method comprising the steps of:

(a) reading the numerical control instructions one at a time;

(b) determining whether the numerical control instruction is a G-code instruction;

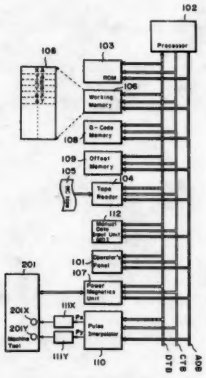
(c) accessing a memory location in the G-code memory designated by the numerical value if the numerical control instruction is a G-code instruction;

(d) changing a bit designated by the code at the memory

location to a first logical value if the numerical control instruction is a G-code instruction;

(e) changing all other bits at the memory location to a second logical value if the numerical control instruction is a G-code instruction; and

(f) executing numerical control processing in dependence upon the contents of the G-code memory.

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**4,591,969**

## MICROPROCESSOR-CONTROLLED POSITIONING SYSTEM

**Robert D. Bloom, Montrose, Pa.; Edward J. Burke, Apalachin, and Eugene T. Kozol, Binghamton, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Aug. 11, 1983, Ser. No. 522,144**

**Int. Cl.[4] G05B *11/01*; B41J *11/42***

**U.S. Cl. 364—183** **5 Claims**

1. In a printer system, a carriage for feeding a print medium in increments of one or more line spaces having a drive means and a motion indicating means,

said motion indicating means comprising emitter means and a displacement counter,

said emitter means being coupled to said drive means for generating first displacement pulses in response to movement of said drive means,

said displacement counter being connected to said emitter means for counting said first displacement pulses and generating second displacement pulses by counting a predetermined number of said first displacement pulses,

said first and second displacement pulses each being respectively indicative of first and second increments of a line space,

a control system for operating said drive means comprising in combination,

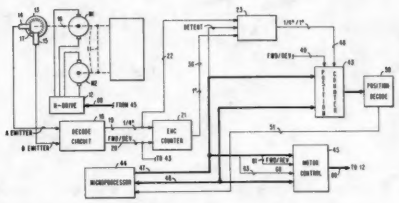
a position counter,

switch means connecting said position counter to said emitter means and to said displacement counter,

said switch means being adapted to enable said position counter to receive either said first or said second displacement pulses, and

control means including a microprocessor operative to perform a sequence of drive control operations to operate said drive means to effect movement and positioning of said drive means relative to an initial stop line position,

said sequence of drive control operations performed by said microprocessor including a first drive control operation for initiating the operation of said drive means to advance said print medium, and a second drive control operation for setting said position counter to count a predetermined number of said second displacement pulses from said displacement counter in response to control signals indicative of the extent of movement by said drive means to




advance said print medium from said initial stop line position to a second desired stop line position,

said sequence of drive control operations by said microprocessor further including a third drive control operation for activating said switch means to enable said position counter to receive only said second displacement pulses from said displacement counter whereby said displacement counter provides an initial second displacement pulse to said position counter by counting first displacement pulses from said emitter means including first displacement pulses generated by said emitter means as a result of error movement of said drive means occurring during performance of said sequence of drive control operations by said microprocessor.

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**4,591,970**

**Patent Not Issued For This Number**

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**4,591,971**

## METHOD AND APPARATUS FOR PARALLEL PROCESSING OF DIGITAL SIGNALS USING MULTIPLE INDEPENDENT SIGNAL PROCESSORS

**John Darlington, and Michael J. Reeve, both of London, England, assignors to National Research Development Corporation, London, England**

**Continuation of Ser. No. 433,094, Oct. 6, 1982, abandoned. This application Jan. 2, 1985, Ser. No. 688,373**

**Claims priority, application United Kingdom, Oct. 15, 1981, 8131085**

**Int. Cl.[4] G06F *15/16***

**U.S. Cl. 364—200** **52 Claims**

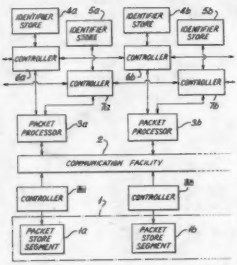
1. A digital computer comprising:

digital store means for storing digital data at identifiable

locations in the form of packets comprising both instructions and other data for processing in accordance with such instructions;

a plurality of independent digital processing units for processing said packets;

communication means for transferring data between the processing units and the digital store means;




a first group of discrete digital stores arranged to store identifiers of packets which require processing; and

transfer and interface means connected to said first group of stores for enabling any identifier stored in any store of said first group to be transferred to any other store within that group and to enable transfer of identifiers in either direction between the processing units and the first group of identifier stores.

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**4,591,972**

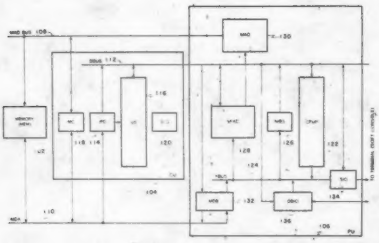
**DATA PROCESSING SYSTEM WITH UNIQUE MICROCODE CONTROL**

**James M. Guyer, Marlboro; David I. Epstein, Framingham, and David L. Keating, Holliston, all of Mass., assignors to Data General Corp., Westborough, Mass.**

**Filed Nov. 15, 1982, Ser. No. 441,969**

**Int. Cl.[4] G06F *9/16, 13/00***

**U.S. Cl. 364—200** **1 Claim**



1. In a data processing system including processor means for processing said data, memory means for storing said data and for storing instructions for directing operation of said system, and bus means for conducting said data and said instructions between said memory means and said processor means, said processor means comprising:

CPU processor means connected to said bus means for performing arithemetic and logical operations upon said data, and

microcode control means connected from said bus means and responsive to said instructions for providing sequences of microinstructions for controlling said operations of said system

said microcode control means being adapted to be responsive to said operations of said system and to select subsequences of microinstructions in response thereto,

means connected from said bus means for receiving said instructions,

means connected from other portions of said system for receiving information regarding state of said operations of said system,

microcode memory means for storing and providing said sequences of microinstructions, and

microcode sequence control means responsive to said received instructions and to said state of operations information for providing to said microcode memory means addresses for selecting said sequences of microinstructions, said microcode sequence control means comprising:

sequence control internal microcode control means responsive to operation of said sequence control means and to said microinstructions and to said state of operation information for providing signals for controlling operation of said sequence controller means,

register means connected from said instruction receiving means and said state receiving means and responsive to said sequence control internal microcode control means for receiving and storing an initial address of a presently selected one of said microinstruction sequences,

microcode program counter means connected to said register means and responsive to said sequence control internal microcode control means for receiving said initial address and providing successive said addresses of said presently selected one of said microinstruction sequences,

address multiplexor means connected from said register means and said microcode program counter means and said sequence control internal microcode control means for providing said addresses to said microcode memory means, and

microcode state save means, including microcode state register means, connected from said sequence control means and responsive to said sequence control internal microcode control means for receiving said storing and address and start of execution of a presently executing microinstruction, and microcode stack means having inputs connected from said microcode state save means and outputs connected to said address multiplexor means for saving and restoring state of execution of interrupted ones of said microinstructions.

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**4,591,973**

**INPUT/OUTPUT SYSTEM AND METHOD FOR DIGITAL COMPUTERS**

**Fred O. Ferris, III, Falls Church, Va., and Harri G. Prival, Potomac, Md., assignors to Sperry Corporation, New York, N.Y.**

**Filed Jun. 6, 1983, Ser. No. 501,232**

**Int. Cl.[4] G06F *13/32***

**U.S. Cl. 364—200** **3 Claims**

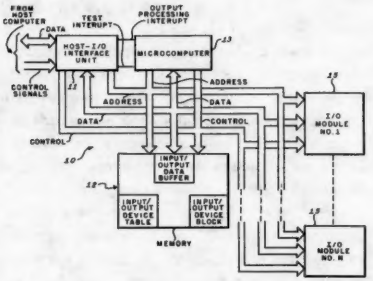
1. An input/output (I/O) system that selectively couples a host computer to a plurality of external peripheral devices, said host computer having a memory with a plurality of locations for storing data to be transferred to said plurality of phripheral devices, said I/O system comprising:

digital computer means coupled to receive processing and test interrupt signals from said host computer for processing and distributing host computer supplied address, data

and control signals to said plurality of external peripheral devices,

memory means included in said digital computer means coupled to receive said address, data and control signals from said host computer for storage of said host computer supplied address, data and control signals to be transferred to said plurality of external peripheral devices,

a device table in said memory means having a plurality of locations each location for storing a field which contains an address of a selected peripheral device and a function code which may be modified by said host computer during operation for specifying a sub-routine for processing said host computer supplied data by said digital computer means,




a data buffer in said memory means having a plurality of locations paired with locations in said device table respectively for receiving address, data and control signals transferred in high speed bursts by said host computer,

a device data block in said memory means having a plurality of locations corresponding to addresses in said device table, said locations in said data block being coupled to said external peripheral devices for the transfer thereto of host computer supplied data processed by said digital computer means, and

a plurality of I/O modules each including an address circuit for coupling to said device data block locations in said memory means.

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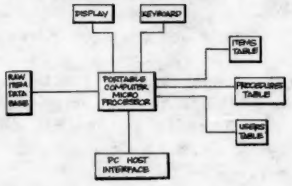
**4,591,974**

## INFORMATION RECORDING AND RETRIEVAL SYSTEM

**Donald H. Dornbush, and Donald J. Bowersox, both of Okemos, Mich., assignors to Technology Venture Management, Inc., Lansing, Mich.**

**Filed Jan. 31, 1984, Ser. No. 575,471**
**Int. Cl.[4] G06F** *15/16*
**U.S. Cl. 364—200** **12 Claims**
**MICROFICHE APPENDIX INCLUDED**
**(3 Microfiche, 126 Pages)**




1. A method for providing data items in a host microcomputer with a screen, printer or other visual display means for displaying the data items in table form, wherein the data is collected by user personnel which comprises:

(a) providing a first host microcomputer with a first visual display means and a first memory interface controlled by a first microprocessor including first data item entry means to the first microprocessor;

a second portable hand held computer having a second memory interface controlled by a second microprocessor including second data item entry means to the second microprocessor and a second visual display means for showing data items in table form;

a communication link means for communication between the first and second memory interfaces;

a first program in the first host microcomputer which transfers data items in table form to the hand held computer upon command for assembly into table form in the hand held computer, wherein the host microcomputer is programmed to produce table forms including procedures and lines for data items to be collected and for user identification codes for authorized users; and

a second program in the hand held computer which collects data items in the table form using the second data entry means wherein the data items are transferred when linked with the first host microcomputer by the communication link means and memory interfaces;

(b) collecting through user personnel the data items in the hand held computer using the second data entry neans;

(c) running the second program in the hand held computer and the first program in the host microcomputer to transfer the data items to the host microcomputer by the communications link means and memory interfaces and to thereby empty the hand held computer of all data items;

(d) running the second program in the hand held computer and the first program in the host microcomputer to receive data items through the communication link means; and

(e) running the first program in the host microcomputer to produce reports based upon the data items in the host microcomputer for visualization on the display means, wherein the data items transferred to the hand held computer varies over time according to varying information to be collected and user personnel.

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**4,591,975**

## DATA PROCESSING SYSTEM HAVING DUAL PROCESSORS

**Donald A. Wade, Westboro; Eric M. Wagner, Douglas; Lawrence L. Krantz, Marlborough, and R. W. Goodman, Hopkinton, all of Mass., assignors to Data General Corporation, Westboro, Mass.**

**Filed Jul. 18, 1983, Ser. No. 515,089**
**Int. Cl.[4] G06F** *13/00, 3/00*
**U.S. Cl. 364—200** **9 Claims**

3. A data processing system comprising:

memory means;

first processor means, said first processor means having means for executing computer programs under a first operating system and means for controlling all input and output operations of said data processing system;

second processor means, said second processor means having means for executing computer programs under a second operating system;

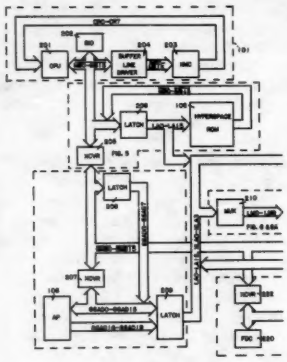
input/output device interface means;

bus means, connected to said memory means, said input/output device interface means, said first processor and said second processor; for transferring at least data and addresses and

control means, connected to said first processor and said second processor, and said bus means for controlling which of said processors is allowed access to said bus means, said control means including

means for detecting an input or output request by said second processor,

means for holding said second processor when said second processor requests an input or output operation, and



means for starting said first processor when said second processor requests an input or output operation.

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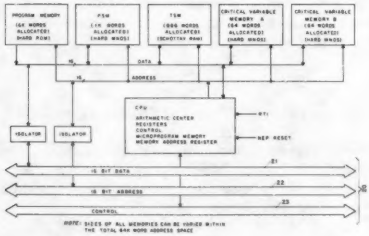
**4,591,976**

## MULTIPLE TASK ORIENTED PROCESSOR

**Douglas G. Webber, San Diego, and George C. Schenck, Hermosa Beach, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Jun. 17, 1983, Ser. No. 505,165**
**Int. Cl.[4] G06F *12/16, 12/06, 15/52***
**U.S. Cl. 364—200** **2 Claims**



**1.** A computer system comprising a plurality of processors operating in parallel and interconnected via a global bus, which may be subject to a short duration radiation event, each processor having its own cycle time, with synchronization by connection to a system clock, the system being partitioned by functional requirements into tasks that minimize both the number and rate of transfer of variables between processors;

wherein each of said processors comprises a central processing unit, a program memory comprising read only memory devices, a permanent storage memory comprising MNOS devices, a temporary storage memory comprising fast, volatile, bipolar random access memory devices, critical variable memory means comprising first and second memories of MNOS devices, and a local bus interconnecting the central processing unit and said memories, and isolating means coupled between the local bus and the global bus for providing isolation between them, there being means actuated in response to a program request with respect to a variable requiring access to another of said processors to initiate an automatic sequence to remove the isolation at said isolation means and to establish a linkage;

wherein said MNOS devices comprise memory field effect transistors which in the permanent storage memory are used with a slow write for long retentivity storage of constants including target constants and IMU calibration parameters, and in the critical variable memory means are used with approximately a 50-microsecond clear/write time to provide greater than one hour retentivity, the MNOS devices having relatively reduced thresholds, the memory field effect transistors having channels of a short length, harder oxides, and relatively shallow diffusions in device areas and bit lines, the processors further having digital logic circuits of a bipolar type selected from low power Schottky TTL and $I^2L$;

each processor cycle having a sync time for synchronization with the other processors, followed in sequence by three activity phases, comprising a first activity phase for intercommunication, a second activity phase for task processing, and a third activity phase for critical variable storage;

wherein within each of said processors, said first and second memories respectively have first and second base addresses, there being means effective during normal processing for storage of critical variables from the temporary storage memory into the critical variable memory means during said third phase in which the storage alternates between the first and second memories on successive processor iterations by means for determining the base address used in the previous iteration and changing to the other, in which the critical variable resulting from each iteration are time tagged and this time is used to bracket the data stored by means for storing a first time value, then storing data, and then storing a last time value, the first and last time values being the same during a cycle provided no radiation event has been detected during the storage sequence;

means actuated in response to passage of one of said radiation events which causes loss of information in the temporary memory store to enter a recovery program, wherein the program includes means to determine whether data in the first or second memory is valid and which is most recent by means for comparing the first and last time values for the first memory, if they are not equal setting the base address to that of the second memory, and alternatively if they are equal to then compare the first and last time values for the second memory, if they are not equal setting the base address to that of the first memory, and alternatively if they are equal to then compare the first time values for the first and second memories and setting the base address to the one of the first and second memories for which the time value is greater, the data being read from the first or second memory of the critical variable memory means as determined by the base address setting and written into the temporary storage memory with the time tag of that point in time for which the data is valid, which allows the recovery, executive, or normal processing to account for the process downtime and to effect remedial action as required;

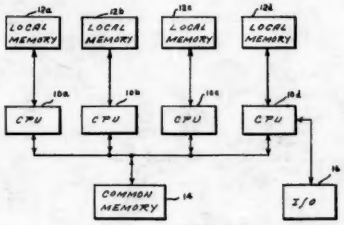
whereby the combination of time tag and base addressing eliminates any need for a separate pointer for the critical variable memory means.

## 4,591,977

## PLURALITY OF PROCESSORS WHERE ACCESS TO THE COMMON MEMORY REQUIRES ONLY A SINGLE CLOCK INTERVAL

**Stanley M. Nissen, Reading; Chris J. Grobicki, Lexington, and William M. Kaupinis, Methuen, all of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Mar. 23, 1983, Ser. No. 477,998**
**Int. Cl.[4] G06F** *15/16*
**U.S. Cl. 364—200** **4 Claims**




1. A multi-microprocessor apparatus comprising in combination:

a plurality of central processing units to receive and process data signals, said plurality of central processing units arranged in parallel with one another, each of said plurality of central processing units respectively including a means for synchronizing which is operatively connected thereto to synchronize the flow of data and signals through each central processing unit, said synchronizing means synchronizing each of said central processing units to a common clock reference,

a plurality of local memory units respectively connected to said plurality of central processing units, each of said plurality of local memory units storing data, instruction and control signals, each central processing unit of said plurality of central processing units communicating only with its local memory unit of said plurality of local memory units, and,

a means for a common memory coupled directly to each of said plurality of central processing units, said common memory means providing data, instruction and control signals to each central processing unit of said plurality of central processing units, the communications between each of said plurality of central processing units and said common memory means being synchronized by its respective synchronizing means wherein access thereto requires only a single clock interval.

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## 4,591,978

## METHOD OF INTERRELATING A MASTER COMPUTER WITH A PERIPHERAL DEVICE

**Steven H. Peterson; Bernard J. Berg, both of Kentwood, and David R. Bowden, Grand Rapids, all of Mich., assignors to Foresight Enterprises Inc., Grand Rapids, Mich.**

**Filed Nov. 14, 1983, Ser. No. 551,673**
**Int. Cl.[4] G06F** *3/00*
**U.S. Cl. 364—200** **6 Claims**

1. A method of interrelating a controlling device having a master computer, operatively associated with a photographic process, with a denistometer having an executory computer, said method comprising:

interconnecting said computers via a serial interface system; and

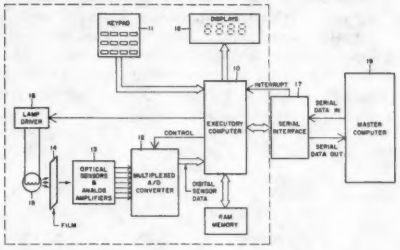
programming said exectory computer to function in the following modes:

A. detecting, registering, and storing data in response to key-setting, and

B. responding to a command string of serial data presented by said master computer via said serial interface system to

(a) interrupt the functions stated at A. above,

(b) receive and store said command string, and render




substantially all of the functions of said densitometer and the control thereof accessible to said master computer,

(c) execute said command string, and

(d) return to the A. mode defined above.

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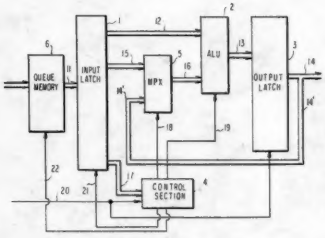
## 4,591,979

## DATA-FLOW-TYPE DIGITAL PROCESSING APPARATUS

**Masao Iwashita, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Aug. 25, 1983, Ser. No. 526,310**
**Claims priority, application Japan, Aug. 25, 1982, 57-147201**
**Int. Cl.[4] G06F** *13/00, 7/00, 9/38, 3/00*
**U.S. Cl. 364—200** **4 Claims**




1. A data flow-type digital processing apparatus comprising:

an input latch including a first section storing a first data, a second section storing a second data, and a third section storing a designation code;

a processing unit having a first input end, a second input end and an output end and adapted to execute an arithmetic operation and/or a logic operation using two input data which are supplied to said first and second input ends;

an output latch including a section storing a result of the arithmetic operation and/or a logic operation of said processing unit;

a multiplexer having a first input portion, a second input portion and an output portion and inserted between said input latch and said processing unit;

a first bus coupling said first section of said input latch to said first input end of said processing unit;

a second bus coupling said second section of said input latch to said first input portion of said multiplexer;

a third bus coupling said output portion of said multiplexer to said second input end of said processing unit;

a fourth bus coupling said output end of said processing unit to the storing section of said output latch;

a fifth bus coupled to said output latch for deriving the result of the storing section of said output latch;

a sixth bus coupling said output latch to said second input portion of said multiplexer to feed back the result of the storing section to said multiplexer; and,

a control unit coupled to said input latch and said multiplexer for selectively applying a first signal and a second signal to said multiplexer according to said designation code stored in said third section of said input latch, said second bus being coupled to said third bus in response to said first signal, said sixth bus being coupled to said third bus in response to said second signal.

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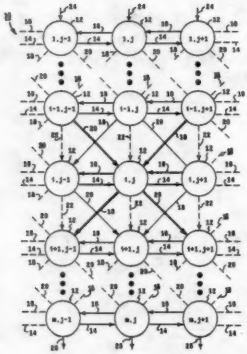
**4,591,980**

## ADAPTIVE SELF-REPAIRING PROCESSOR ARRAY

**Bernardo A. Huberman, Palo Alto, Calif., and Tad H. Hogg, Anchorage, Ak., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Feb. 16, 1984, Ser. No. 580,919**
**Int. Cl.[4] G06F *15/16***
**U.S. Cl. 364—200** **7 Claims**



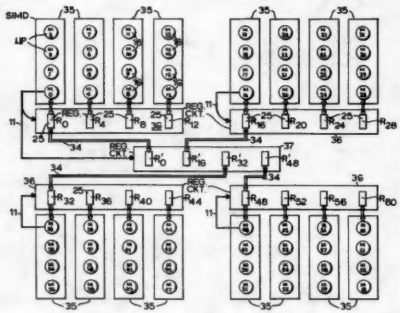
1. An adaptive self-repairing processor array comprising a plurality of identical processing cells arranged in parallel orthogonal columns and rows to form a two dimensional matrix, each of said cells in said array having logic means and a memory for storing a memory state, the first row of said cells in the array forming a parallel input to the array, the last row of said cells in the array forming a parallel output from the array, the cells in the intermediate cell rows between said first and last rows coupled to at least one cell in a previous cell row, said logic means in each cell to compute a new data value based upon said input and its present memory state, said each cell coupled to at least one cell in a subsequent cell row, said new data value provided as an output to said subsequent cell row, each of said intermediate row cells coupled to immediately adjacent neighbor cells of the same row to supply said new data value to said neighbor cells and correspondingly receive new data values from said neighbor cells, said logic means in each cell to compare the new data values received from said neighbor cells with its computed new data value and accordingly update its memory state based upon the results of said comparison.

**4,591,981**

## MULTIMICROPROCESSOR SYSTEM

**Nikola K. Kassabov, Sofia, Bulgaria, assignor to V M E I "Lenin" Quartal Darvenitza, Sofia, Bulgaria**

**Filed Apr. 26, 1983, Ser. No. 488,701**
**Claims priority, application Bulgaria, Apr. 26, 1982, 56357**
**Int. Cl.[4] G06F *15/16***
**U.S. Cl. 364—200** **2 Claims**



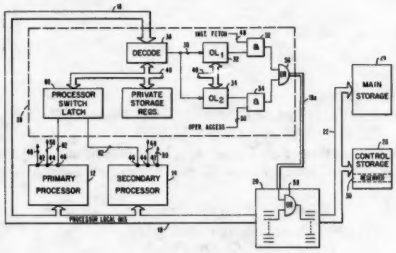
1. A multimicroprocessor system having a plurality of multimicroprocessor structures, each multimicroprocessor structure including N-number of microprocessor units coupled, collectively, to shared memory units and a shared input/output of the multimicroprocessor structure, said microprocessor units being the same and each microprocessor unit including a microprocessor, a data memory, a parallel input/output interface, a sequential input/output and a program memory; wherein said multimicroprocessor structures further comprise respective parallel data exchange register circuits to which the microprocessor units in each multimicroprocessor structure are respectively connected, said parallel data exchange register circuits having respective additional input/outputs; said multimicroprocessor system further comprising first level data exchange register circuits, to which said additional input/outputs of said parallel data exchange register circuits are connected, each first level data exchange register circuit having a control input, connected to address lines in a first of the microprocessor units in a first of said multimicroprocessor structures, and further additional input/outputs, and said multimicroprocessor system further comprising a second level data exchange register circuit, to which said further additional input/outputs of said first level data exchange register circuits are connected, said second level data exchange register circuit having a control input connected to the address lines in the first of the microprocessor units in the first of said multimicroprocessor structures in a first of said first level data exchange register circuits; and each of said microprocessor units further comprising a bi-directional buffer which serves to connect an internal data bus to a shared instruction bus in said multimicroprocessor structure for all of the microprocessor units, the buffer having enable inputs connected to internal busses for circuit selection in the microprocessor unit by the address lines of the microprocessor unit, the address lines of the first microprocessor unit being connected also to the shared memory units in the multimicroprocessor structure, to the shared input/output as well as both to the respective parallel data exchange register circuits and "HALT" inputs of microprocessors in the other microprocessor units in each multimicroprocessor structure through a logic circuit, which serves to switch off the microprocessor units.

## 4,591,982

## STORAGE SELECTION OVERRIDE APPARATUS FOR A MULTIMICROPROCESSOR IMPLEMENTED DATA PROCESSING SYSTEM

**Joseph P. Buonomo; Steven R. Houghtalen; Raymond E. Losinger, and James W. Valashinas, all of Endicott, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Aug. 29, 1983, Ser. No. 527,053**
**Int. Cl.⁴ G06F *9/00, 12/02***
**U.S. Cl. 364—200** **3 Claims**




1. A multiprocessor storage selection override data processing system, comprising:

primary processor means for generating an instruction fetch signal or an operand access signal indicative of the fetch of an instruction and the retrieval of an operand, respectively, and for executing a selected set of instructions;

secondary processor means for executing a set of instructions which is different than the set of instructions executed by said primary processor means;

processor switch means connected to said primary and secondary processor means on one side and to said primary and secondary processor means on the other side for switching on one of said processor means in response to an output signal from the other of said processor means thereby rendering idle said other of said processor means;

latch means connected to the primary and secondary processor means for switching to a set or a reset condition in response to an output signal from said one of said processor means;

logic circuit means connected to said latch means and to said primary and secondary processor means for developing an output signal in response to said set condition from said latch means and to said instruction fetch signal from said primary processor means or in response to said set condition from said latch means and to said operand access signal from said primary processor means or in response to an output signal from said primary or secondary processor means;

main storage means connected to said logic circuit means; and

control storage means connected to said logic circuit means, said control storage means including private storage means,

said primary processor means storing an address of a target instruction in said private storage means when said primary processor means attempts and fails to execute an instruction which is not within said selected set of instructions,

said secondary processor means transferring said target instruction from said main storage means to said control storage means and setting said latch means to said set condition,

said primary processor means reading said address of said target instruction from said private storage means and generating said instruction fetch signal or said operand access signal,

said logic circuit means enabling said control storage means and disabling said main storage means in response to said instruction fetch signal or said operand access signal and when said latch means is in said set condition,

said primary processor means retrieving said target instruction from said control storage means in response to the enabling of said control storage means by said logic circuit means.

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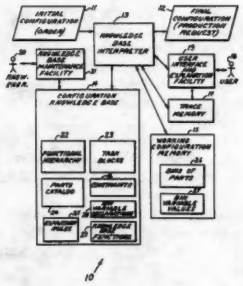
## 4,591,983

## HIERARCHICAL KNOWLEDGE SYSTEM

**James S. Bennett, and Jay S. Lark, both of Palo Alto, Calif., assignors to Teknowledge, Inc., Palo Alto, Calif.**

**Filed Jul. 9, 1984, Ser. No. 628,817**
**Int. Cl.⁴ G06F *15/24***
**U.S. Cl. 364—403** **70 Claims**




67. A knowledge system for designing a product including assemblies of predetermined parts, said knowledge system comprising a computer having a portion of memory storing a knowledge base and a portion of memory subdivided into respective bins for receiving selected names of said parts for comprising the respective assemblies,

said knowledge base including a control procedure for

obtaining a set of assembly constraints including conditions applicable to respective assemblies for indicating whether parts in the respective bins have desired properties and respective actions indicating predetermined changes to the sets of parts in the respective bins for obtaining said desired properties in response to whether the respective conditions are satisfied, and

applying said conditions of said assembly constraints to the respective assemblies and conditionally executing the respective changes in response to whether the conditions are satisfied,

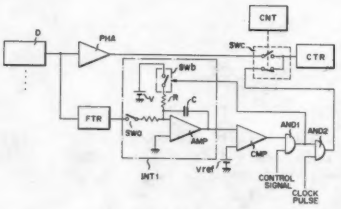
wherein said knowledge base further includes a hierarchy defining at least some of said assemblies as offspring sub-assemblies of respective parent assemblies, and wherein said assembly constraints associated with said parent assemblies have conditions referencing the conditions of parts in the respective offspring bins, and

said computer including means for executing said control procedure to thereby obtain said set of assembly constraints, apply said assembly constraints, and conditionally execute said respective changes to thereby obtain a design for said product, said design being indicated by the list of names of the parts in the bins after said conditions are applied and said changes are conditionally executed.

## 4,591,984
## RADIATION MEASURING DEVICE

Issei Mori, Tochigi, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Aug. 9, 1982, Ser. No. 406,514
Claims priority, application Japan, Aug. 10, 1981, 56-125104; Aug. 28, 1981, 56-135115; Aug. 31, 1981, 56-136363
Int. Cl.[4] G06F *15/42*
U.S. Cl. 364—414 5 Claims




1. A radiation measuring apparatus comprising:

detecting means for detecting photons of radiation impinged thereon and producing pulses thereof, the photons impinging on said detector means in Poisson distribution, and said pulses having width $t_{DS}$;

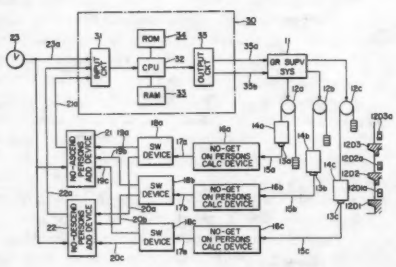
counting means, including clock pulse generator means for generating clock pulses independent of said pulses and having width $t_{CLK}$ which is larger than width $t_{DS}$, for counting said clock pulses during an interval T when at least a part of said pulses exists in one cycle prior to a presently occurring cycle of said clock pulses, and producing a count R; and

correcting means for correcting said count R to compensate for those pulses missed by said counting means and calculating a corrected count R′ using the count R, clock width $t_{CLK}$ and interval T.

## 4,591,985
## APPARATUS FOR ESTIMATING TRAFFIC CONDITION VALUE OF ELEVATORS

Shintaro Tsuji, Nagoya, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 8, 1983, Ser. No. 549,750
Claims priority, application Japan, Nov. 8, 1982, 57-195736
Int. Cl.[4] G66B *1/20*
U.S. Cl. 364—424 7 Claims




1. A demand estimation apparatus for controlling machines wherein a cycle of a cyclically fluctuating demand is divided into a plurality of sections having predetermined time widths, said apparatus comprising:

means for providing a measured demand value for each section of a cycle;

means for determining an estimated demand value for the demand in each section of a cycle on the basis of the measured demand value for a corresponding section of a previous cycle and a weight coefficient;

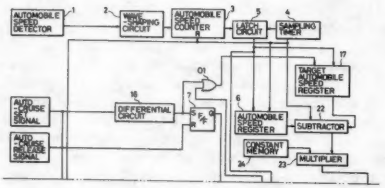
comparison means for comparing the measured demand value and the estimated demand value for each section of a cycle; and

weighting means for producing said weight coefficient for each section of a cycle on the basis of the result of the comparison for each section.

## 4,591,986
## APPARATUS FOR CONTROL OF TRANSITION TO AUTO-CRUISE

Tetsuo Nakajima, and Tomio Aoi, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 18, 1984, Ser. No. 571,890
Claims priority, application Japan, Jan. 27, 1983, 58-10520
Int. Cl.[4] B60K *31/00*
U.S. Cl. 364—426 3 Claims




1. An apparatus for the control of the speed of an automobile while in transition from manual control to auto-cruise, comprising in combination:

means for providing an auto-cruise set signal when control of the speed of said automobile is to be transferred from manual control to auto-cruise control,

means for sampling the real speed of the automobile at predetermined time intervals,

a first register, operative in response to said sampling means and the occurrence of said auto-cruise set signal, to store as a target speed the real speed of the automobile which exists at the moment of occurrence of said set signal,

a set throttle position memory for storing a provisional target throttle position at the time of auto-cruise setting with said target speed of the automobile as a parameter therefor,

a second register for storing the provisional target throttle position read out of said memory based on the real speed of the automobile as it exists at the time of occurrence of said auto-cruise set signal,

means responsive to occurrence of said auto-cruise set signal and to the data stored in said second register for initially setting the position of the automobile throttle to said provisional target throttle position,

means for finding a deviation of said real speed of the automobile from said target speed,

means for computing an amount of compensation for throttle position based on said deviation,

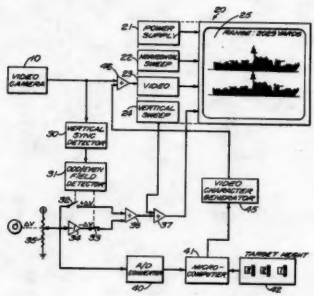
means for changing the data stored in said second register by adding said amount of compensation to the contents of said second register, and

means for controlling the automobile throttle position on the basis of the changing data stored in said second register.

## 4,591,987
## VIDEO RANGEFINDER

David C. Brown, Enfield, Conn., assignor to Kollmorgen Technologies Corp., Dallas, Tex.

Filed Jul. 27, 1983, Ser. No. 517,807
Int. Cl.[4] G06G 7/78
U.S. Cl. 364—458 16 Claims




1. A video range system comprising:

a video monitor for displaying an image of the target being ranged:

means for creating split images of said target on said monitor with a selected separation;

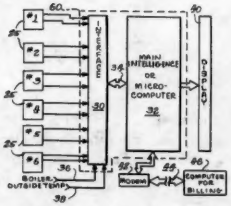
input means for supplying a true dimension of said target; and

computing means for calculating target range from said true dimension and said selected separation of said split images.

## 4,591,988
## ENERGY COST ALLOCATION METHOD AND SYSTEM

Dennis P. Klima, Chicago, and John E. Pakel, Oak Brook, both of Ill., assignors to Control Energy Corporation, Oak Brook, Ill.

Filed Jul. 13, 1983, Ser. No. 513,219
Int. Cl.[4] G01K 17/06; G01F 1/86
U.S. Cl. 364—464 7 Claims

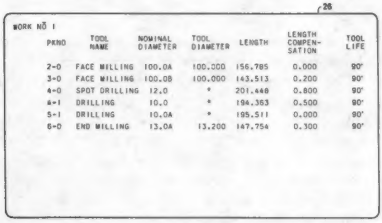



1. A system for allocating heating energy costs among a plurality of units served by a common heat generating installation, each said unit including a heat inlet line and a heat return line coupled to the heat generating installation, said heat return line having a valve therein responsive to given control signals for opening and closing, and a thermostat in each said unit for producing the control signals for opening and closing the return line; said allocating system comprising: temperature responsive means located on each said heat return line for providing a temperature signal which is a predetermined function of the temperature at said return line; and microcomputer means responsive to said temperature signal and to the control signal from said thermostat for recording the time during which said temperature signal corresponds to a temperature at or above a predetermined temperature and said thermostat signal simultaneously corresponds to the open condition of said valve; and allocating means responsive to said recorded time data for each of said units for allocating heating energy costs among said units.

## 4,591,989
## SYSTEM FOR DISPLAYING TOOL PARAMETERS OF TOOLS UTILIZED IN A MACHINING PROCESS

Hitoshi Tanaka, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 3, 1983, Ser. No. 471,614
Claims priority, application Japan, Mar. 4, 1982, 57-34451
Int. Cl.[4] G06F 15/46; G05B 19/18
U.S. Cl. 364—474 4 Claims



WORK NO 1

| PRNO | TOOL NAME | NOMINAL DIAMETER | TOOL DIAMETER | LENGTH | LENGTH COMPENSATION | TOOL LIFE |
|---|---|---|---|---|---|---|
| 2=0 | FACE MILLING | 100.0A | 100.000 | 156.785 | 0.000 | 90' |
| 3=0 | FACE MILLING | 100.0B | 100.000 | 143.513 | 0.200 | 90' |
| 4=0 | SPOT DRILLING | 12.0 | * | 201.446 | 0.800 | 90' |
| 4=1 | DRILLING | 10.0 | * | 194.363 | 0.500 | 90' |
| 5=1 | DRILLING | 10.0A | * | 185.511 | 0.000 | 90' |
| 6=0 | END MILLING | 13.0A | 13.200 | 147.754 | 0.300 | 90' |

1. A numerically controlled machining system comprising:

a numerical control unit for controlling a machine tool, said numerical control unit including an input device, an arithmetic unit for effecting arithmetic operations on commands entered through said input device, a memory for storing the commands from said input device and the results of the arithmetic operations of said arithmetic unit, and a control unit for controlling the arithmetic operations in said arithmetic unit;

means for storing in said memory a machining program having machining pattern commands for specifying machining patterns, tool commands for specifying tools, tool parameters and positional information commands for specifying positional information for the tools, wherein said tool parameters include nominal tool diameters, tool diameters, tool lengths, length compensations indicative of the amounts of wear on the tools, and tool lives, wherein the term "length compensation" used herein means the amount of wear on the tool, the term "tool diameter" means the diameter of the tool, the term "tool length" means the distance between the tip end of a tool and the end face of a spindle on which the tool is mounted, and the term "tool life" is the period of time in which a tool can be used for a cutting operation;

means for selecting only the tool commands and associated specified tools from the stored machining program;

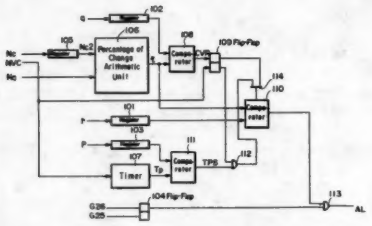
means for displaying tool parameters selected by said selecting means, wherein said displaying means displays a list of the selected tools in their machining order in the stored machining program; and

automatic length setting means for measuring the length of each tool.

## 4,591,990
## SPINDLE ROTATIONAL FREQUENCY CHECKING METHOD

Ryoichiro Nozawa, Tokyo, and Nobuyuki Kiya, Hachioji, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP82/00169, § 371 Date Dec. 20, 1982, § 102(e) Date Dec. 20, 1982, PCT Pub. No. WO82/04005, PCT Pub. Date Nov. 25, 1982
Continuation of Ser. No. 456,008, Dec. 20, 1982, abandoned.
This PCT application May 14, 1982, Ser. No. 761,671
Claims priority, application Japan, May 14, 1981, 56-072832
Int. Cl.[4] G05B *23/00*; G06F *15/46*
U.S. Cl. 364—474 5 Claims




1. A method of checking the rotational frequency of a spindle, having an actual rotational velocity, in a numerically controlled machine tool for rotating the spindle on the basis of a commanded spindle rotational velocity issued by a numerical control device, a maximum allowable time for reaching the commanded spindle rotational velocity being predetermined, said method comprising the steps of:

(a) computing a first percentage of velocity change using the commanded rotational velocity of the spindle and the actual rotational velocity of the spindle;

(b) determining a zone of maximum allowable velocity change and a zone of commanded velocity;

(c) discriminating whether the first percentage of velocity change is within the zone of maximum allowable velocity change when the zone of commanded velocity is reached;

(d) comparing the difference between an actual elapsed time and the maximum allowable time when the zone of commanded velocity is not reached; and

(e) issuing an alarm signal when the first percentage of velocity change is not within the zone of maximum allowable velocity change.

## 4,591,991
## CODING METHOD AND SYSTEM FOR ASSEMBLY LINE PALLETS

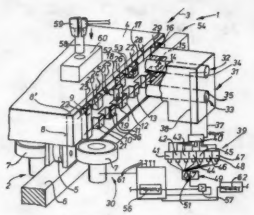
Walter Sticht, Attnang-Puchheim, Austria, assignor to STIWA-Fertigungstechnik Sticht GesmbH, Attnang-Puchheim, Austria

Filed Apr. 6, 1984, Ser. No. 597,641
Claims priority, application Austria, Apr. 21, 1983, 1435/83; Feb. 6, 1984, 361/84
Int. Cl.[4] G06F *15/46*
U.S. Cl. 364—478 21 Claims

1. A method of coding a pallet on which a plurality of parts are assembled to form a workpiece in a assembly line, wherein the pallet is moved in a conveying direction along the assembly line to successive work stations where the parts are processed or assembled and wherein the pallet is encoded to generate respective signals indicating respective defects in the workpiece on the pallet in a respective one of the work stations for excluding the defective workpiece from work in work stations subsequent thereto, wherein the improvement comprises the steps of

(a) arranging a plurality of carriers of respective ones of said signals on the pallet in adjacent rows extending in the conveying direction, and

(b) arraying respective ones of said signal carriers in rows extending perpendicularly to the adjacent rows for enabling



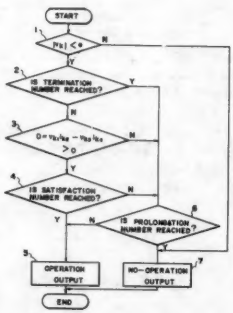
the signals in the perpendicular rows to be sensed simultaneously,

(l) one of the adjacent rows providing a respective one of the signal carriers in each one of the perpendicular rows.

## 4,591,992
## METHOD AND SYSTEM FOR IDENTIFYING THE DIRECTION OF A FAULT IN A POWER LINE

Mitsuru Yamaura, Hachioji, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Dec. 23, 1983, Ser. No. 564,680
Claims priority, application Japan, Dec. 28, 1982, 57-230022
Int. Cl.[4] G01R *31/08*; H02H *3/26*
U.S. Cl. 364—483 24 Claims




1. A direction identification method for identifying the direction of a close-in fault, comprising the steps of:

(a) sampling a voltage and a current;

(b) judging whether or not the voltage is less than a predetermined threshold;

(c) determining the direction of a fault in accordance with the polarity of a discriminant D given by:

$$D = V_{k1} i_{k2} - v_{k3} i_{k4}$$

where

$v_{kj}$ ($j=1$ or 3) represents a sample value of the voltage at a sampling time point kj,

$i_{kj}$ ($j=2$ or 4) represents a value which is a function of a sample value of the current at a sampling time point kj, and

$k1 = n - m - M$

$k2 = n$

$k3 = n - m$

$k4 = n - M$

where

m represents an integer equal to the number of sampling opera-

tions over an interval equal to a multiple of a half cycle of the system frequency,

M represents an interger, and

n represents a sampling time point;

wherein the determination of the direction in accordance with the polarity of the discriminant D is made for sampling time points n within a predetermined time interval from occurrence of a fault; and

(d) producing, when the voltage is less than said predetermined threshold and the fault is found to be within a direction of a protection zone, a signal for use as a condition for triggering a fault responsive device.

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**4,591,993**

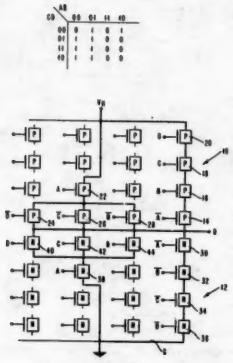
## METHODOLOGY FOR MAKING LOGIC CIRCUITS

**William R. Griffin, and Lawrence G. Heller, both of South Burlington, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 21, 1983, Ser. No. 554,148**

**Int. Cl.⁴ H03K *19/094***

**U.S. Cl. 364—491** **12 Claims**



1. A method of designing a logic circuit which satisfies the requirements of a truth table having a given number of binary input literals and binary output values which comprises

forming inputs of first and second product terms of a first Boolean function $Q_P$ from a truth table by complementing the binary input literals which are a 1 when the output value is a binary 1 and using the true binary input literal which is a 0 when the output value is a binary 1,

forming inputs of first and second product terms of a second Boolean function $Q_N$ from said truth table by complementing the binary input literals which are a 0 when the output value is a binary 0 and using the true binary input literal which is a 1 when the output value is a binary 0,

applying a voltage representative of each input of said first and second product terms of said first Boolean function to control gates of a plurality of P channel transistors interconnected to form first and second series circuits, respectively,

connecting said first and second series circuits parallel to each other between a voltage source and an output terminal,

applying a voltage representative of each input of said first and second product terms of said second Boolean function to control gates of a plurality of N channel transistors interconnected to form third and fourth series circuits, respectively, and

connecting said third and fourth series circuits parallel to each other between said output terminal and a point of reference potential.

**4,591,994**

## METHOD AND APPARATUS FOR CONTROLLING SHAPE OF SINGLE CRYSTAL

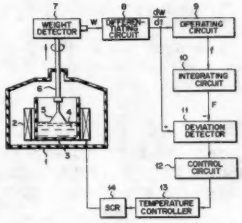
**Syoichi Washizuka, Yokohama, and Sadao Matsumura, Tokyo, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Oct. 18, 1983, Ser. No. 543,046**

**Claims priority, application Japan, Nov. 30, 1982, 57-208481**

**Int. Cl.⁴ B01D *9/00*; G06G *7/66, 7/58***

**U.S. Cl. 364—500** **12 Claims**




1. A method for controlling the shape of a single crystal, comprising the steps of:

detecting the weight of a single crystal pulled by the Czochralski method, to obtain a weight signal W;

differentiating the weight signal W of the single crystal over time, to obtain a differential signal dW/dt;

computing $(A \cdot dW/dt + B)\theta$ by use of the differential signal dW/dt, to obtain an operation signal f, where A and B are parameters which are determined in accordance with predetermined manufacturing conditions of the Czochralski method, respectively, and $\theta$ is a preset growing angle of the single crystal;

integrating the operation signal f over time, to obtain an integral signal F;

comparing the integral signal F and the differential signal dW/dt, to obtain a deviation signal; and

controlling heating power supplied to a crucible using the deviation signal, to keep the growing angle of the single crystal constant.

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**4,591,995**

## PROCESS AND DEVICE FOR MONITORING SINGLE STRANDS IN STRANDING PROCESSES

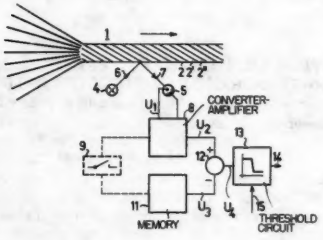
**Robert Schürch, Uster, Switzerland, assignor to Zellweger Uster Ltd., Uster, Switzerland**

**Filed Mar. 8, 1983, Ser. No. 473,212**

**Claims priority, application Switzerland, May 18, 1982, 3072/82**

**Int. Cl.⁴ G01N *29/04*; G06F *15/46*; G05B *12/02***

**U.S. Cl. 364—507** **14 Claims**




1. A process for monitoring single strands for correct sequence, correct surface quality, breakages or run-outs in the

stranding process for manufacture of multi-strand rope or cable, comprising the steps of:

storing a signal pattern representative of at least one peripheral line of a representative section in the longitudinal direction of a fault-free rope or cable;

scanning a rope or cable with wave energy along a peripheral line corresponding to that of said stored signal pattern;

converting wave energy received from said rope or cable to an electrical signal;

comparing the pattern of said electrical signal with said stored signal pattern to detect differences therebetween, and

generating a fault signal when the difference between said electrical signal and said stored signal pattern exceeds a predetermined tolerance limit.

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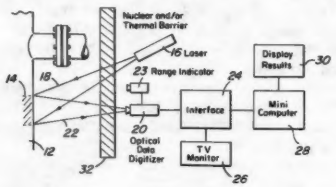
## 4,591,996

## APPARATUS AND METHOD FOR DETERMINING STRESS AND STRAIN IN PIPES, PRESSURE VESSELS, STRUCTURAL MEMBERS AND OTHER DEFORMABLE BODIES

**Reginald I. Vachon, P.O. Box 1182, Atlanta, Ga. 30301**

**Continuation of Ser. No. 264,445, May 18, 1981, abandoned.**
**This application Aug. 21, 1985, Ser. No. 767,663**
**Int. Cl.[4] G01B *11/16***
**U.S. Cl. 364—508** **11 Claims**




1. An apparatus for determining stress and strain associated with a surface, said apparatus comprising:

light source means to provide a light beam for illuminating said surface;

optical data receiving means for sensing a reference speckle pattern and a succeeding speckle pattern produced by a reflected light source reflected from an illuminated area of said surface when undergoing deformation, said optical data receiving means further serving to digitize signals provided by said reflected speckle patterns; and

computation means for mathematically analyzing the amplitude of said digitized signals to determine displacement between the speckle pattern reflected from the surface in a reference state and the speckle pattern reflected from the surface when undergoing deformation and thereby to determine stress and strain associated with said surface.

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## 4,591,997

## METHOD OF STORING AND PRINTING IMAGE WITH NON-REENTRANT BASIC DISK OPERATING SYSTEM

**Vernon Grabel, Cotuit, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Nov. 28, 1983, Ser. No. 555,832**
**Int. Cl.[4] G06K *3/00*; G06F *15/40***
**U.S. Cl. 364—519** **6 Claims**

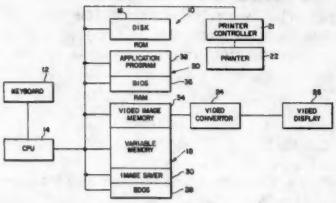
1. A method for storing and printing an image utilizing computer graphics apparatus of the type having a non-reentrant operating system comprising the steps of:

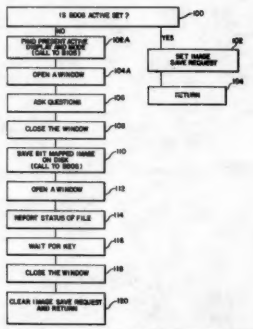
A. requesting the computer graphics apparatus to save bit mapped image data for a selected image on an external data storage medium;

B. determining whether the operating system is active and holding further action pursuant to said image save request if the operating system is determined to be active;

C. determining at the end of each period in which the operating system is active whether an image save request was made during that period of operating system activity;

D. saving said bit mapped image data on the external storage medium either immediately in response to said image save




request upon the determination in step B that the operating system is not active or after the termination of operating system activity in response to the determination in step C that said image save request was made during a period of operating system activity; and,

E. printing the image from said bit mapped image data stored on said external storage medium.

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## 4,591,998

## DYNAMIC BAR PATTERN METHOD

**Gilbert G. Kuperman, and Donald L. Wallquist, both of Dayton, Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Dec. 1, 1983, Ser. No. 556,861**
**Int. Cl.[4] G06F *3/153, 15/66***
**U.S. Cl. 364—521** **12 Claims**

1. A method for generating a moving grate of sinusoidal luminance modulated patterns comprising the steps of:

computing a first array of sinusoid amplitude numeric values, the computed values defining between ¼ and N integral sinusoid cycles;

generating a plurality of additional sinusoid numeric value arrays each similar to said first array and each containing numeric values phase displaced from said first and succeeding arrays by predetermined increments of sinusoid phase;

storing said arrays in incrementally accessible predetermined order;

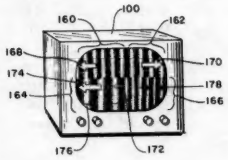
reading a stored array in synchronism with scanning a luminance modulated display, array element value controlling display luminance at each display pixel;

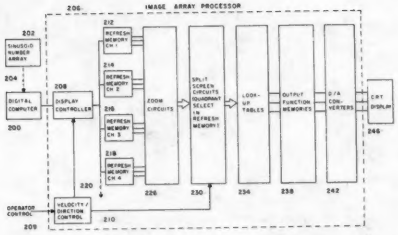
repeating the reading of each array in predetermined ele-

ment order forward or backward to form a grate display of luminance sinusoids;

applying predetermined sign correction to read array elements when required to define negative sinusoid portions;

continuing the repeated reading for a duration selected in response to desired display and eye persistence;




incrementing and decrementing the array reading to succeeding and preceding arrays in storage in response to luminance grate forward and reverse movement requirements, the rate of incrementing determining the rate of luminance sinusoid grate movement.

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**4,591,999**

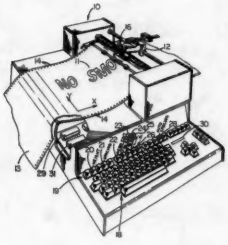
## METHOD AND APPARATUS FOR AUTOMATICALLY SPACING CHARACTERS DURING COMPOSITION

**David J. Logan, Glastonbury, Conn., assignor to Gerber Scientific Products, Inc., Manchester, Conn.**

**Filed Sep. 6, 1983, Ser. No. 529,834**

**Int. Cl.[4] G06F *15/46*; B41J *19/32***

**U.S. Cl. 364—523** **14 Claims**



**1.** A method for establishing the spacing between adjacent characters in a system for generating text lines of characters through the use of a computer and an associated computer memory device, said method comprising:

providing a memory device storing data describing a font of characters of a given size and including for each such character a first data set defining the shape of the character and a second data set defining approximately the shape of the left side of the character by way of a plurality of left side digital values and the shape of the right side of the character by way of a plurality of right side digital values, said left side digital values being related to the shape of the left side of said character at respectively different levels along the height of said character and said right side digital values being related to the shape of the right side of said character at respectively different levels along the height of said character,

reading from said memory device the data for a sequence of selected characters to be generated as a line of text,

for each adjacent pair of selected characters of said sequence processing in said computer said plurality of right side digital values of the left character and said plurality of left side digital values of the right character in accordance with a program to produce spacing data, and

generating a line of characters using for the generation of each character said first data set defining its shape and using for the space between each adjacent pair of characters said spacing data derived from said processing of said digital values.

**14.** A machine for generating text lines of characters, said machine comprising:

a memory device storing data describing a font of characters of a given size and including for each such character a first data set defining the shape of the character and a second data set defining approximately the shape of the left side of the character by way of a plurality of left side digital values and the shape of the right side of the character by way of a plurality of right side digital values, said left side digital values being related to the shape of the left side of said character at respectively different levels along the height of said character and said right side ditigal values being related to the shape of the right side of said character at respectively different levels along the height of said character,

means for seleting a sequence of characters to be generated and for reading from said memory device the data relating to the sequence of characters,

a processor for processing for each adjacent pair of said selected characters the plurality of right side digital values of the left character and the plurality of left side digital values of the right character in accordance with a program to produce spacing data, and

means for generating a line of characters using for the generation of each character said first data set defining its shape and using for the space between each adjacent pair of characters said spacing data derived from said processing of said digital values.

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**4,592,000**

## ELECTRONIC CLINICAL THERMOMETER, AND METHOD OF MEASURING BODY TEMPERATURE

**Hideo Ishizaka, and Tadashi Fujii, both of Fujinomiya, Japan, assignors to Terumo Corporation, Tokyo, Japan**

**Filed Jun. 14, 1983, Ser. No. 504,235**

**Claims priority, application Japan, Jun. 24, 1982, 57-108895; Jun. 24, 1982, 57-108896**

**Int. Cl.[4] G01K *7/24***

**U.S. Cl. 364—557** **14 Claims**

**1.** An electronic clinical thermometer which comprises:

means for sensing body temperature at a prescribed part of a body;

logical arithmetic means for predicting a final, stable temperature based on the sensed body temperature, said arithmetic means storing a plurality of temperature prediction functions in which elapsed measurement time is a variable, each function defining a temperature change up to a final, stable temperature;

display means for displaying temperature;

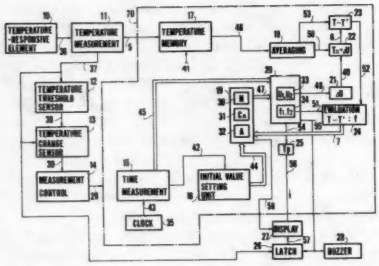
means which clocks elapsed measurement time, and means for controlling said temperature sensing means and said arithmetic means at sampling instants; and

storage means for temporarily accumulating temperatures sensed by said temperature sensing means at said sampling instants;

said logical arithmetic means:

(a) selecting one of the temperature prediction functions;

(b) reading the accumulated temperatures out of said storage means, comparing a predicted value of temperature for the present sampling instant with a temperature, sensed by said temperature sensing means, associated with the present sampling instant, and obtaining the difference between the predicted value and the sensed temperature on the basis of the comparison, said predicted value being obtained in accordance with the selected temperature prediction function based on a




temperature among said read temperatures which is associated with a past sampling instant and elapsed measurement time up to said past sampling instant;

(c) selecting a new temperature prediction function, and returning to (b) when said difference lies outside prescribed limits; and

(d) obtaining a predicted value of final, stable temperature corresponding to said selected temperature prediction function, and supplying the obtained value of the final, stable temperature to said display means, when said difference lies within said prescribed limits.

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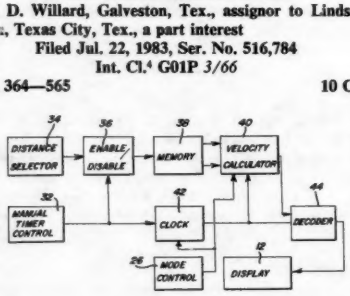
**4,592,001**

## SPEED GAUGING INDICATOR

**Virginia D. Willard, Galveston, Tex., assignor to Lindsay E. Austin, Texas City, Tex., a part interest**

**Filed Jul. 22, 1983, Ser. No. 516,784**
**Int. Cl.[4] G01P *3/66***
**U.S. Cl. 364—565** **10 Claims**




**1**. For use in determining the speed of an observer from a vehicle moving along a path, along which landmarks of different types are respectively spaced from each other by predetermined uniform distances, a time and velocity indicating device comprising timer means for measuring time of movement of the said vehicle between said landmarks, means connected to the said timer means for calculating velocity of the said vehicle from the measured time and said distances, and visual display means connected to the said timer means and the said velocity calculating means for alternative readout of the measured time and the calculated velocity, the improvement including memory means connected to the velocity calculating means for storing data related to a plurality of said predetermined uniform distances, and distance selector means connected to the memory means for selecting said stored data to control operation of the velocity calculating means in accordance with the type of landmarks observed by the observer.

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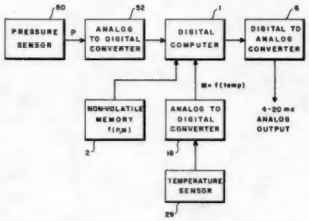
**4,592,002**

## METHOD OF DIGITAL TEMPERATURE COMPENSATION AND A DIGITAL DATA HANDLING SYSTEM UTILIZING THE SAME

**Theodore B. Bozarth, Jr., Perkasie; Arthur M. Olsen, Pennsburg, and Ronald H. Rowlands, Collegeville, all of Pa., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Dec. 13, 1983, Ser. No. 561,252**
**Int. Cl.[4] G06F *15/20***
**U.S. Cl. 364—571** **18 Claims**




**1**. A method for digital temperature compensation of a digital-to-analog converter system comprising the steps of

sensing a temperature affecting the digital data handling system,

converting the sensed temperature into a digital temperature representation,

supplying the digital temperature representation to a digital computer for use by the digital computer in computing a digital output in accordance with a characterization equation which is at least partly a function of the digital temperature representation and

applying the digital output as a digital input to the digital-to-analog converter system.

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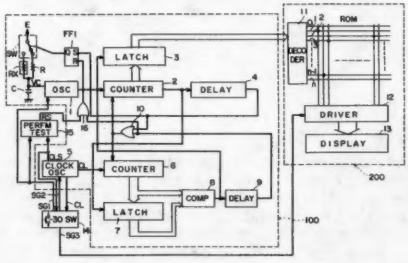
**4,592,003**

## MEASURING CIRCUIT DEVICE

**Toshiyuki Kobayashi, Kyoto; Takao Ohta, Nagaokakyo; Masatsugu Miura, and Hidetoshi Matsumoto, both of Kyoto, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed Aug. 10, 1983, Ser. No. 521,837**
**Claims priority, application Japan, Aug. 12, 1982, 57-140563; Oct. 4, 1982, 57-150963[U]; Dec. 27, 1982, 57-234510**
**Int. Cl.[4] G01K *7/16***
**U.S. Cl. 364—579** **6 Claims**




**1**. A measuring circuit device comprising:

measuring circuit means,

display means for displaying data generated from the measuring circuit means,

display test circuit means for testing said display means and providing a visual display by said display means of said test,

performance test circuit means for actuating said measuring circuit means to display predetermined reference measured data by said display means,

switching means for initiating operation of said device, and

switching circuit means responsive to actuation of said switching means for actuating said display test circuit means and said performance test circuit means, and for initiating a measuring operation by said measuring circuit means after said display test circuit means tests said display means and said performance test circuit actuates said measuring circuit means to display said predetermined reference data.

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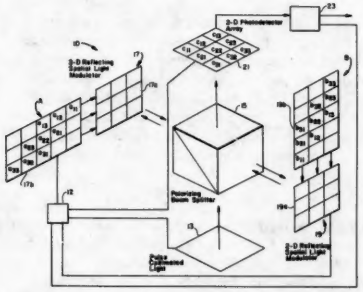
**4,592,004**

## ELECTROOPTICAL MATRIX MULTIPLICATION USING THE TWOS COMPLEMENT ARITHMETIC FOR IMPROVED ACCURACY

**Richard P. Bocker; Stanley R. Clayton, and Keith Bromley, all of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 21, 1984, Ser. No. 612,288**
**Int. Cl.[4] G06F *7/56;* G06G *9/00***
**U.S. Cl. 364—713** **5 Claims**



1. An apparatus for improving accuracy in an electrooptical matrix-matrix multiplier using twos complement arithmetic comprising:

a source of pulsed collimated light;

first means disposed to be illuminated by the pulsed collimated light source for providing a first matrix of optical encoded information of numbers in the twos complement binary representation;

second means disposed to be illuminated by the pulsed collimated light source for providing a second matrix of optical encoded information of numbers in the twos complement binary representation, the first matrix providing means and the second matrix providing means are adapted to be mutually orthogonally displaced with respect to one another to optically align different encoded information of numbers of twos complement binary representations each time the light source is pulsed to enable the multiplication thereof, the first matrix providing means and the second matrix providing means each include a reflective surface behind a two-dimension spatial light modulator stacked to advance their encoded information of numbers of twos complement binary representations mutually orthogonal with respect to each other each time the light source is pulsed;

a polarizing beam splitter located to receive pulsed collimated light from the source and orthogonally direct it to the first matrix providing means and to direct light reflected therefrom to the second matrix providing means that is orthogonally disposed with respect to the polarizing beamsplitter and to redirect light reflected from the second matrix providing means;

means disposed in an aligned relationship with the polarizing beam splitter to receive the redirected light therefrom for adding successively multiplied encoded information of numbers in the twos complement binary representation of the first matrix providing means and the second matrix providing means to be expressed as mixed binary representation signals; and

means coupled to receive the mixed binary representation signals for decoding to twos complement and decimal representations.

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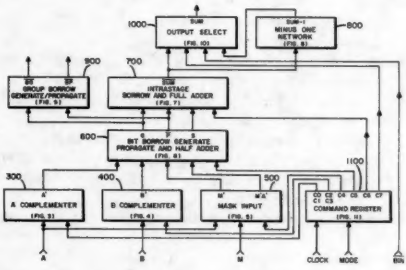
**4,592,005**

## MASKED ARITHMETIC LOGIC UNIT

**Glen R. Kregness, Minnetonka, Minn., assignor to Sperry Corporation, New York, N.Y.**

**Filed Jul. 6, 1982, Ser. No. 395,519**
**Int. Cl.[4] G06F *7/38;* G05F *7/50***
**U.S. Cl. 364—736** **10 Claims**



1. An arithmetic logic unit comprising:

a. an integrated adder means comprised of a first half-adder means and a second full-adder means sequentially interconnected;

b. a first operand means and a second operand means for respectively receiving first and second operands, both connected to said first half-adder means; and

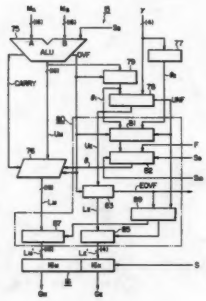
c. a masking means including a logical AND means also connected to said first half-adder means via said logical AND means to selectively inhibit portions of said first and second operands from entering said adder means and to integrate into said first half-adder means the logical AND function to thereby provide an arithmetic logic unit without additional logic levels over a non-masked adder means.

4,592,006

## ADDER FOR FLOATING POINT DATA SUITABLE FOR DIGITAL SIGNAL PROCESSING

Yoshimune Hagiwara; Shizuo Sugiyama, both of Kodaira; Narimichi Maeda, Tachikawa; Osamu Yumoto, Kokubunji; Takashi Akazawa, Kodaira; Masahito Kobayashi, Yokohama; Yasuhiro Kita, Hachioji, and Yuzo Kita, Fuchu, all of Japan, assignors to Hitachi, Ltd. and Hitachi Denshi Kabushiki Kaisha, both of Tokyo, Japan

Division of Ser. No. 311,680, Oct. 15, 1981, Pat. No. 4,511,990.
This application Feb. 12, 1985, Ser. No. 700,907
Claims priority, application Japan, Oct. 31, 1980, 55-152051
Int. Cl.[4] G06F *7/50*
U.S. Cl. 364—748 9 Claims



1. An adder for floating point data comprising:

adjusting means for adjusting two floating point data so that the two data have an exponent part of the same value and respective adjusted mantissa parts;

adding means connected to said adjusting means for adding the two adjusted mantissa parts of the two data;

shifting means connected to said adding means for shifting the output data of said adding means;

first means connected to said adding means and responsive to the output thereof for providing a first shift data signal having a value necessary for normalization of said output data of said adding means;

second means responsive to the exponent part at the output of said adjusting means and said first shift data signal for providing difference data representing the difference between the value of said exponent part and the value of said first shift data signal, and for generating an underflow signal when said difference is less than a minimum value predetermined for an exponent of any floating point data;

third means for providing, as a normalized exponent part of the sum of the two data, a minimum value data corresponding to said minimum value or said difference data, depending upon whether or not said underflow signal is generated; and

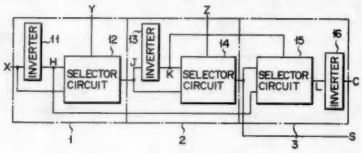
fourth means for providing the shifting means with a second shift data signal or said first shift data signal depending upon whether or not said underflow signal is generated, said second shift data signal having a value equal to the difference between the exponent part at the output of said adjusting means and said minimum value so as to control said shifting means to provide a normalized mantissa part for the sum of said two data.

4,592,007

## FULL ADDER USING COMPLEMENTARY MOSFETS

Masahide Ohhashi, Sagamihara, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Sep. 29, 1982, Ser. No. 428,033
Claims priority, application Japan, Dec. 3, 1981, 56-194768
Int. Cl.[4] G06F *7/50*
U.S. Cl. 364—784 14 Claims




1. A full adder comprising:

a first logic circuit having first signal inverting means which receives a first input signal and produces a first output signal, and first signal selecting means which receives said first input and said first output signal and produces a second output signal which is equal to one of said first input signal or said first output signal depending on the state of a second input signal;

a second logic circuit having second signal inverting means which receives said second output signal and produces a third output signal, and second signal selecting means which receives said second output signal and said third output signals and produces a fourth output signal which is equal to one of said second or third outputs signal depending on the state of a third input signal; and

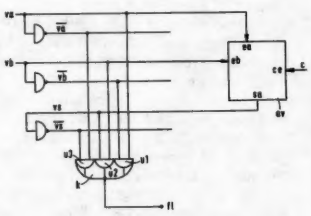
a third logic circuit which receives said first output signal and said fourth output signal and produces a fifth output signal which is equal to one of said last-mentioned signals depending on the state of said third output signal.

4,592,008

## OVERFLOW DETECTOR FOR ALGEBRAIC ADDERS

Guido H. Nopper, Umkirch, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Jan. 28, 1983, Ser. No. 461,792
Claims priority, application European Pat. Off., Feb. 18, 1982, 82101201.0
Int. Cl.[4] G05F *7/50*
U.S. Cl. 364—784 3 Claims



1. Insulated-gate field-effect transistor (MOS) integrated overflow detector for algebraic adders which add two binary numbers (a, b) in two's complement notation and contain one full adder per digit which provides a sum signal and a carry signal, comprising:

a complex gate (k) consisting of three two-input AND elements (u1, u2, u3), with

the outputs of the three AND elements NORed,

the two inputs of the first AND element (u1) being fed with the sign signal (va) of the first binary number (a) and with

the inverted sign signal ($\overline{vb}$) of the second binary number (b), respectively,

the two inputs of the second AND element (u2) respectively being fed with the sign signal (vb) of the second binary number (b) and with the sum signal (vs) provided by the full adder (av) of the sign digits, and

the two inputs of the third AND element (u3) being fed with the inverted sum signal ($\overline{vs}$) and with the inverted sign signal ($\overline{va}$) of the first binary number (a), respectively.

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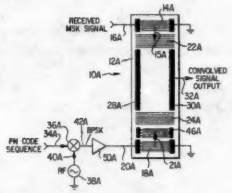
**4,592,009**

## MSK SURFACE ACOUSTIC WAVE CONVOLVER

**Michael S. Masheff, St. Petersburg, Fla., assignor to E-Systems, Inc., Dallas, Tex.**

**Filed Nov. 17, 1983, Ser. No. 552,835**
**Int. Cl.[4] G06G *7/195;* H03H *9/30;* H01L *41/08***
**U.S. Cl. 364—821** **17 Claims**




1. A surface acoustic wave (SAW) convolver for use in a communication system in which a received signal incorporates a narrowband information signal phase-modulated thereon according to a first modulation scheme, comprising:

a substrate for propagating acoustic wave signals on the top surface thereof;

first transducer means formed on said top surface for receiving said received signal and in response thereto generating acoustic surface waves along a first direction thereof;

second transducer means formed on said top surface for receiving a reference signal and in response thereto generating acoustic surface waves along a second direction thereof, said reference signal incorporating a pseudonoise (PN) code sequence phase-modulated thereon according to a second modulation scheme;

means integrally-formed on said substrate for converting said acoustic surface waves representing said reference signal into a form compatible with said first modulation scheme, said means for converting including first and second interdigital eletrodes each having varying potentials with respect to ground according to the acoustic surface waves representing said reference signal and each including a plurality of spaced, electrically conductive fingers; and

means for convolving said received signal and said reference signal to produce a convolution signal.

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**4,592,010**

## MEMORY-PROGRAMMABLE CONTROLLER

**Dieter Wollscheid, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Jan. 4, 1984, Ser. No. 568,107**
**Claims priority, application Fed. Rep. of Germany, Jul. 1, 1983, 3323824**
**Int. Cl.[4] G06F *13/10, 15/46***
**U.S. Cl. 364—900** **4 Claims**

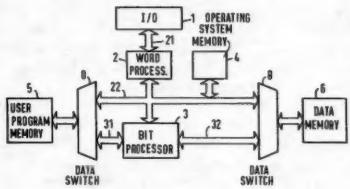
1. In a memory-programmable controller of the type having a cyclically traversed user control program for controlling a peripheral process, including a word processor for processing operating system and word commands, a word processor bus coupled to the word processor, a bit processor for processing binary interlinking commands, a user program memory wherein the control program including the word and interlinking commands is stored, an operating system memory wherein an operating system program including the operating system commands is stored and a data memory wherein binary process images of the process are stored, the improvement comprising the bit processor being coupled to the word processor bus and including:

means for executing a first binary interlinking command from the user program memory;

first bus means;

means coupled to said first bus means for fetching from the user program memory a next binary interlinking or word command via said first bus means;

second bus means;




data processing means coupled to said second bus means and to said means for executing;

said second bus means allowing said data processing means to access data from said data memory when said first command is being executed; and

means coupled to said means for fetching for assembling said next command and for transferring the next command to said means for executing if said next command is a binary interlinking command, thereby allowing said means for executing to process data from said data memory in accordance with said next command immediately after the first command is executed.

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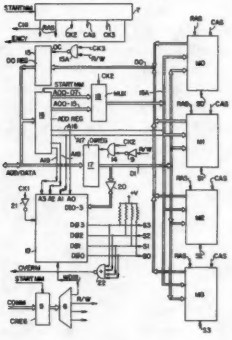
**4,592,011**

## MEMORY MAPPING METHOD IN A DATA PROCESSING SYSTEM

**Calogero Mantellina, Cerro Maggiore; Roberto Trivella, Monza, and Andrea Quadraruopolo, Rho, all of Italy, assignors to Honeywell Information Systems Italia, Milan, Italy**

**Filed Oct. 31, 1983, Ser. No. 547,268**
**Claims priority, application Italy, Nov. 4, 1982, 24060 A/82**
**Int. Cl.[4] G06F *12/02***
**U.S. Cl. 364—900** **1 Claim**



1. A memory mapping method in a data processing system wherein the memory comprises a variable number of modules (MO, M1, M2, M3) up to a maximum of P modules, each

module including a plurality of addressable locations whose number may very by multiples of a basic capacity so that said memory may be considered as comprised of a variable number of addressable locations partitioned in a plurality of memory blocks, whose number may range up to a maximum number of possible blocks, each memory block having a number of locations equal to said basic capacity, each of said memory blocks belonging to one of said modules, said modules comprising a number of memory blocks which may differ from module to module, the addressing of a memory location involving the selection of the module containing said location by a directory having a number of addressable locations at least equal to said maximum number of said possible blocks, each directory location being related to a possible block and loaded with a binary code identifying the one of said modules to which the related block belongs, said binary code, when read out, generating a signal selecting the pertinent module, characterized in that the method comprises the following steps:

(a) storing into said directory locations a first binary code identifying a first module as the module to which the related possible block belongs;

(b) storing of test codes into predetermined memory locations each belonging to a different possible block;

(c) reading out the contents of said predetermined locations to determine by comparison of said contents with at least one of said test codes whether or not said predetermined locations and the related blocks are present and belong to said first module;

(d) storing a second binary code into the directory locations related to the possible blocks not belonging to said first module;

(e) storing of test codes into a set of predetermined memory locations, each belonging to a different possible block of said blocks not belonging to said first module;

(f) checking by reading said predetermined locations of said set and by comparison of their contents with at least one of said test codes whether or not said predetermined locations and the pertinent blocks are present and belong to said second module;

(g) repeating in successive order steps (d), (e), (f), for all the subsequent P-2 modules; and

(h) storing into directory locations related to possible blocks identified as not belonging to any module of a binary code, which when read, generates an overflow signal.

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**4,592,012**

## METHOD OF INTERFACING PERIPHERAL DEVICES WITH A CENTRAL PROCESSOR

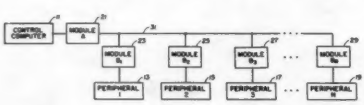
**Leon Braun, Hollywood, Fla., assignor to Sebrn Corporation, Miami, Fla.**

**Division of Ser. No. 416,177, Sep. 2, 1982, Pat. No. 4,497,041. This application Dec. 7, 1984, Ser. No. 679,587**

**The portion of the term of this patent subsequent to Jan. 29, 2002, has been disclaimed.**

**Int. Cl.[4] G06F** *3/00, 5/00, 7/00*

**U.S. Cl. 364—900** **12 Claims**




1. A method of interfacing a plurality of peripheral digital information gathering devices, such as cash registers, with a central digital processing means, the method comprising the steps of:

(a) connecting an interface module having a memory with each such peripheral device and obtaining information therefrom in the form of a digital series of N-bit words:

(b) storing each said series of N-bit words respectively in said interface module memory:

(c) masking those words in said interface module memories which are to be disregarded;

(d) providing memory receiving means for receiving the non-disregarded memory output of said module memories:

(e) providing means for transferring said memory outputs;

(f) providing said memory receiving means with a not-empty indicator, in combination with said memory output transfer means, to thereby block further input from said peripheral devices when said memory receiving means has words in storage; and

(g) communicating each digital series of non-disregarded memory words from said memory to the central processing means.

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**4,592,013**

## METHOD AND DEVICE FOR ADDRESSING A MEMORY

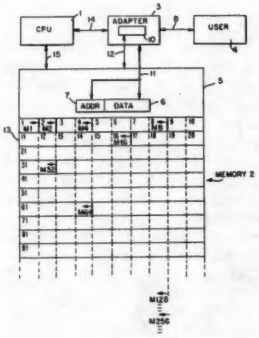
**Eric S. Prame, Lidingo, Sweden, assignor to International Business Machines Corp., Armonk, N.Y.**

**Filed Aug. 17, 1982, Ser. No. 409,004**

**Claims priority, application Sweden, Aug. 21, 1981, 81049819**

**Int. Cl.[4] G06F** *9/36*

**U.S. Cl. 364—900** **4 Claims**




1. A memory system including a memory (2), a memory control unit (5), a memory address register (61) and at least one data register (62), characterized in that the memory control unit includes:

a shift register (26) for receiving an M-bit address part (M) of an N-bit address word on an input address channel (21);

an exponent register (27) for receiving a p-bit exponent part (P) of said N-bit address word, each permutation of said p-bit exponent part representing one of $2^p-1$ digital values;

shifting circuits (25, 41, 50) for shifting the contents of said shift register a number of binary positions equal to the digital value represented by the permutation of said p-bit exponent part in said exponent register to provide a shifted M-bit address part;

transfer means (35, 36, 37) for transferring the M-bit shifted address part from said shift register (26) to the memory address register (61) for addressing the memory (2); and

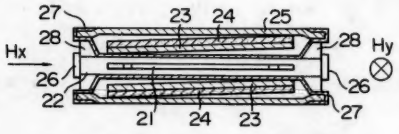
data defining circuits (28, 32, 33, 34) connected, and responsive to, said exponent register (27) and said shifting circuits, for defining a number of successive accesses to the memory, whereby the digital value of the permutation of said p-bit exponent part modifys the M-bit address part to define an initial memory address for a basic data unit (BDU) and the number of BDU's to be accessed.

**4,592,014**

## MAGNETIC BUBBLE MEMORY DEVICE

**Yutaka Akiba, Fujisawa, and Kazuo Hirota, Yokohama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Aug. 7, 1984, Ser. No. 638,578**
**Claims priority, application Japan, Aug. 22, 1983, 58-152691**
**Int. Cl.[4] G11C *19/08***
**U.S. Cl. 365—1** **15 Claims**




1. A magnetic bubble memory device comprising:

a cassette including a bubble memory chip, a set of upper and lower magnets disposed above and below said bubble memory chip, respectively, for generating a bias magnetic field to sustain magnetic bubbles in said bubble memory chip, a magnetic shield case having a set of upper and lower plates disposed above said upper magnetic and below said lower magnet, respectively, and coupled to one another, a first conductive shield case for enclosing said upper magnet and said upper plate, a second conductive shield case for enclosing said lower magnet and said lower plate, and external connection terminals provided on at least one of side surfaces of said cassette; and

a body of the magnetic bubble memory device including a core in the form of a picture frame larger than said cassette, a pair of coils wound on said core for generating a rotating magnetic field to propagate the magnetic bubbles in said bubble memory chip, a third conductive shield case for enclosing said core, said pair of coils and said cassette adapted to be mounted in a central space of said core, said third conductive shield case being divided into upper and lower portions, and connector means arranged for connection with said external connection terminals of said cassette;

wherein when said cassette is mounted in the central space of said core, said first and second conductive shield cases of said cassette are coupled to said upper and lower portions of said third conductive shield case of said body, respectively, so that said bubble memory chip, said core and said pair of coils are placed in a single space delimited by said first, second and third conductive shield cases.

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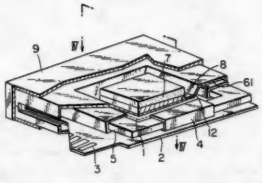
**4,592,015**

## MAGNETIC BUBBLE MEMORY MODULE

**Yutaka Akiba, Fujisawa, and Kazuo Hirota, Yokohama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 5, 1984, Ser. No. 627,893**
**Claims priority, application Japan, Jul. 6, 1983, 58-121627**
**Int. Cl.[4] G11C *5/04, 19/08***
**U.S. Cl. 365—2** **9 Claims**




1. A magnetic bubble memory module comprising:

an annular rectangular parallelepiped core of soft magnetic material provided with respective windings on four sides thereof;

a magnetic bubble memory chip arranged in a space defined by said annular rectangular parallelepiped core; and

a shielding conductor case which covers as a whole said windings, said annular rectangular parallelepiped core and said magnetic bubble memory chip, said shielding conductor case being provided with a recess so that a central portion of said shielding conductor case is brought near said magnetic bubble memory chip.

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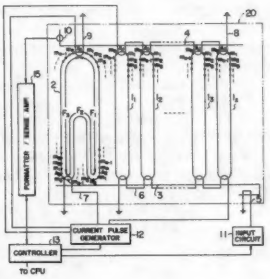
**4,592,016**

## MAGNETIC BUBBLE MEMORY DEVICE

**Yoshihiro Sekiguchi, Tachikawa; Kazutoshi Yoshida; Shinsaku Chiba, both of Mobara; Mamoru Sugie, Sayama, and Hirokazu Aoki, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 2, 1983, Ser. No. 557,458**
**Claims priority, application Japan, Dec. 3, 1982, 57-211428**
**Int. Cl.[4] G11C *19/08***
**U.S. Cl. 365—15** **9 Claims**




3. A magnetic bubble memory comprising:

a plurality of loops for storing data information, the total number of said plurality of loops being greater than the number of storage bits of each of said loops; and

magnetic storage map circuit means for storing map information of wheather each of said loops is to be utilized for data storage, said magnetic storage map circuit means having a storage capacity greater than the number of storage bits of each loop.

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**4,592,017**

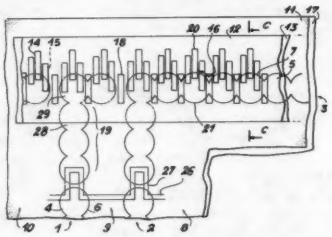
## MAGNETIC BUBBLE MEMORY

**Jean M. Fedeli, St. Egrève; Hubert Jouve, Biviers; Joël Magnin, St. Martin D'Heres, and Christian Pisella, Rives/Fure, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Jun. 19, 1984, Ser. No. 622,191**
**Claims priority, application France, Jun. 28, 1983, 83 10664**
**Int. Cl.[4] G11C *19/08***
**U.S. Cl. 365—19** **5 Claims**

1. A magnetic bubble memory having a series of longitudinally oriented minor shift registers and at least one transversely oriented major access register said minor and said major registers having patterns whereof the boundaries are defined by ionically implanted zones of a magnetic garnet layer, means for transferring the bubble from one end of the minor register to the major register, means for displacing the bubbles in each minor register by applying a rotating magnetic field, means for displacing the bubbles in the major register by the circulation of currents in two electrically conductive sheets superimposed on the magnetic garnet layer, which sheets are isolated from one another and from said layer, and which sheets are provided with windows facing the patterns of said register, wherein end portions of a succession of the windows are in

registration with the register pattern boundaries defined by said ionically implanted zones to enable the bubbles to circulate whilst remaining in contact with the boundaries of the patterns of the major register in the implanted zones of the garnet, and wherein the major register comprises successions of patterns respectively corresponding to each minor register



which are separated by implanted zones and arranged laterally with respect to the minor register, windows in each of the two conductive sheets having common surface portions with the patterns of the major register for each succession of patterns, at least one of the two sheets having a window between each succession of patterns.

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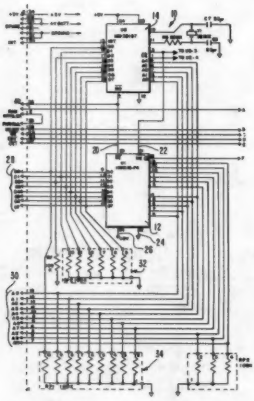
**4,592,018**

## REMOVABLE RAM PACKAGE FOR AMBULATORY MEDICAL MONITOR

**Douglas C. Wiegman, Bellevue, Wash., assignor to Vita-Stat Medical Services, Inc., Bellevue, Wash.**

**Filed Aug. 29, 1983, Ser. No. 527,453**
**Int. Cl.[4] G11C** *5/06, 17/00*
**U.S. Cl. 365—63** **10 Claims**



1. A removable RAM package for data acquisition comprising:

(a) a power supply;

(b) a RAM coupled to a data bus and an address bus, said RAM also electrically coupled to an elongated multiterminal edge connector for connecting the removable RAM package to an external device having an elongated multiterminal edge connector for mating engagement with said RAM package connector, said RAM being powered by said power supply;

(c) an interlock circuit which senses when the removable RAM package is properly connected to said external device substantially along the entire length of said edge connectors, said interlock circuit being powered by said power supply, and said interlock circuit preventing writes to said RAM unless said removable RAM package is properly connected to said external device substantialy along the entire length of said edge connectors.

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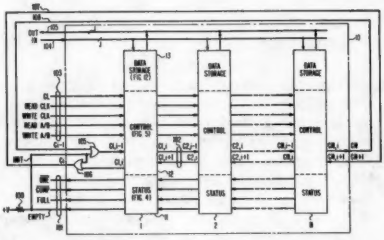
**4,592,019**

## BUS ORIENTED LIFO/FIFO MEMORY

**Alan Huang, Ocean, and Jay H. O'Neill, Old Bridge, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Aug. 31, 1983, Ser. No. 527,982**
**Int. Cl.[4] G11C** *19/28, 7/00*
**U.S. Cl. 365—78** **10 Claims**



1. A memory circuit including a plurality of memory cells all connected to a common input bus and a common output bus and each memory cell including data storage means and a control circuit, said control circuit comprising

means for generating a data occupancy status signal,

write control means responsive to data occupancy status signals from said memory cell and a selectable adjacent memory cell for controlling the writing of data from said input bus into said data storage means, and

read control means responsive to data occupancy status signals from said memory cell and a selectable adjacent memory cell for controlling the reading of data from said data storage means to said output bus.

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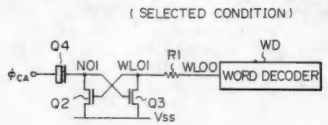
**4,592,020**

## SEMICONDUCTOR MEMORY DEVICE HAVING CLAMP CIRCUITS

**Yoshihiro Takemae, Tokyo; Tomio Nakano, Kawasaki, and Kimiaki Sato, Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Nov. 22, 1983, Ser. No. 554,338**
**Claims priority, application Japan, Nov. 29, 1982, 57-207507**
**Int. Cl.[4] G11C** *11/40*
**U.S. Cl. 365—189** **9 Claims**




1. A semiconductor memory device operatively connected to receive a control signal, comprising:

word lines having a selected or non-selected state;

clamp circuits, each of said clamp circuits operatively connected to a corresponding one of said word lines for clamping the potential of a non-selected word line to a reference potential, said clamp circuits forming a flip-flop having a first terminal operatively connected to said corresponding one of said word lines and a second terminal operatively connected to receive the control signal for

operating each of said clamp circuits, the control signal being applied when the potential of a selected one of said word lines exceeds at least the potential necessary for inverting the condition of said flip-flop, each of said clamp circuits including:

a first MIS transistor having a gate, having a source operatively connected to ground, and having a drain; and

a second MIS transistor having a gate operatively connected to the drain of said first transistor, having a source operatively connected to ground, and having a drain operatively connected to the gate of said first transistor, the drain of said first MIS transistor corresponding to said first terminal and the drain of said second MIS transistor corresponding to said second terminal.

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## 4,592,021

## DATA READOUT CIRCUIT FOR AN MOS TRANSISTOR ARRAY

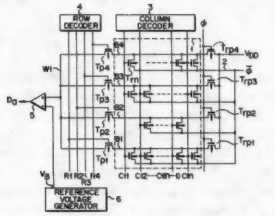
**Hiroaki Suzuki, Yokohama, and Itsuo Sasaki, Kawasaki, both of Japan, assignors to Shibaura Kenki Kabushiki Kaisha, Japan**

**Filed Jul. 29, 1983, Ser. No. 518,348**

**Claims priority, application Japan, Aug. 31, 1982, 57-150902**

**Int. Cl.[4] G11C *7/00***

**U.S. Cl. 365—189** **4 Claims**




1. A data readout circuit for an MOS transistor array comprising:

an MOS transistor array including a plurality of first MOS transistors in a matrix of row and column groups;

a plurality of data output lines, each of which is connected to one end of the current path of each of said first MOS transistors of a corresponding row group;

a plurality of selection signal input lines, each of which is connected to the gate electrodes of the first MOS transistors of a corresponding column group of MOS transistors;

a column decoder for sending first control signals to said selection signal input lines;

a data output node coupled to the other end of each of said MOS transistors current paths;

a plurality of second MOS transistors for effecting selective connections between said plurality of data output lines and said data output node;

a plurality of driving lines for selectively driving said second MOS transistors;

a row decoder which sends second control signals to said driving lines;

a precharge voltage source;

means for precharging and discharging said data output lines and said data output node in accordance with said first and second control signals, said precharging and discharging means including a plurality of third MOS transistors each connected between a corresponding one of said data output lines and said precharge voltage source; and

means for obtaining readout data in accordance with the potential level on said data output node,

wherein said first MOS transistors have a first conductivity type and said second and third MOS transistors have a second conductivity type, said second MOS transistors being rendered conductive while both said data output node and said data output lines are in a precharged state.

## 4,592,022

## SEMICONDUCTOR MEMORY

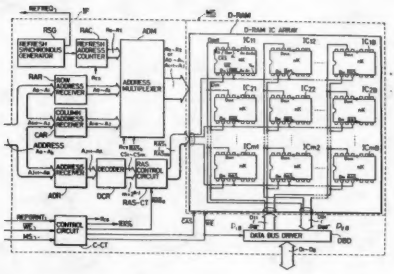
**Katsuhiro Shimohigashi, Musashimurayama; Hiroo Masuda, Kodaira; Kunihiko Ikuzaki, Tokyo, and Hiroshi Kawamoto, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Division of Ser. No. 638,982, Aug. 8, 1984, Pat. No. 4,539,658, which is a division of Ser. No. 377,958, May 13, 1982, Pat. No. 4,472,792. This application Jul. 19, 1985, Ser. No. 756,707**

**Claims priority, application Japan, May 13, 1981, 56-70733**

**Int. Cl.[4] G11C *11/40, 13/00***

**U.S. Cl. 365—189** **8 Claims**




1. A semiconductor memory formed in a semiconductor integrated circuit comprising:

a memory cell array occupying an area of a semiconductor substrate, said area of the array having opposite ends;

said memory cell array including a plurality of data lines which extend from one of said opposite ends of said area of the array to the other of said opposite ends, a plurality of word lines which extend in a direction traversing the data lines, and a plurality of memory cells arrayed in said memory cell array in association with said data and word lines;

each of said memory cells including a P-channel MOS transistor and a capacitive element which is coupled to one of said data lines through the source-drain path of said P-channel MOS transistor, the gate of said P-channel MOS transistor being coupled to one of said word lines;

a plurality of sense amplifiers including a plurality of pairs of N-channel transistors and a plurality of pairs of P-channel transistors;

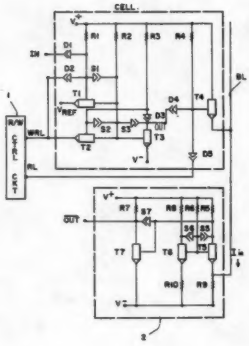
said plural pairs of N-channel transistors being formed in said semiconductor substrate at said one end of said area of the array, each pair of said N-channel transistors being cross-coupled to each other and being coupled to a pair of adjacent ones of said data lines;

said plural pairs of P-channel transistors being formed in said semiconductor substrate at said other end of said area of the array, each pair of said P-channel transistors being cross-coupled to each other and being coupled to a pair of adjacent ones of said data lines so as to construct each of said sense amplifiers together with said cross-coupled pair of N-channel transistors associated with the same pair of data lines.

## 4,592,023
## LATCH FOR STORING A DATA BIT AND A STORE INCORPORATING SAID LATCH

**Hervé Beranger, Fontainebleau; Armand Brunin, Le Mee, and Jean-Paul Rousseau, Perthes, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 21, 1984, Ser. No. 623,052**
**Claims priority, application European Pat. Off., Oct. 28, 1983, 83430036.0**
**Int. Cl.[4] G11C 7/00**
**U.S. Cl. 365—189** **12 Claims**




1. In a read/write random access memory at least one bistable circuit, said bistable circuit comprising:

first, second and third transistors each of said first, second and third transistors having an emitter, base and collector, said collectors of said first and second transistors and said base of said third transistor being connected in common, said emitter of said first transistor being connected to a reference source of potential, said emitter of said third transistor being connected to a second potential source;

a first resistor connected between said base of said first transistor and a first potential source;

a second resistor connected between said common connection of said collectors of said first and second transistors and said base of said third transistor, and said first potential source;

a third resistor connected between said base of said second transistor and said first potential source;

a data-in terminal for receiving a binary data bit;

a write control input terminal for receiving a write control signal;

a read control input terminal for receiving a read control signal;

an output terminal for manifesting the binary state of said bistable circuit;

a fourth resistor connected between said output terminal and said first potential source;

a first diode connected between said data-in terminal and said base of said first transistor;

a second diode connected between said base of said first transistor and a common connection between said write control input terminal and said emitter of said second transistor;

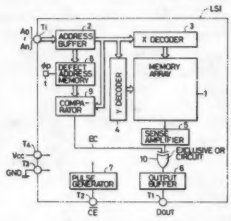
a third diode connected between said collector of said third transistor and said base of said second transistor; and

a fourth diode connected between said collector of said third transistor and said output terminal.

## 4,592,024
## SEMICONDUCTOR ROM

**Kikuo Sakai, Hachiohji; Yoshiaki Onishi, deceased, late of Kokubunji, and by Junko Onishi, administratrix, Nagoya, all of Japan, assignors to Hitachi, Ltd. and Hitachi Microcomputer Engineering Ltd., both of Tokyo, Japan**

**Filed Jul. 1, 1983, Ser. No. 510,319**
**Claims priority, application Japan, Jul. 2, 1982, 57-113916**
**Int. Cl.[4] G11C 7/00**
**U.S. Cl. 365—200** **16 Claims**




1. A semiconductor ROM comprising:

a memory portion which includes a plurality of memory cells,

a selection circuit which selects one of the memory cells in response to input address signals,

a detection circuit which is capable of detecting predetermined combinations of the input address signals and for providing a detection signal when said predetermined combination of input address signals is detected, and

an output circuit comprising means having an exclusive OR function which receives a signal read out from said memory portion and the detection signal supplied from said detection circuit, and which performs an exclusive OR operation on said signal read out from said memory portion and said detection signal to produce a signal of a logic level corresponding to said signal read out from said memory portion when no detection signal is provided from said detection circuit, and a signal of a logic level not corresponding to said signal read out from said memory portion when a detection signal is provided from said detection circuit.

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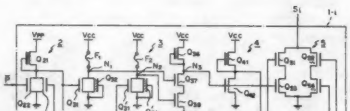
## 4,592,025
## INFORMATION STORING CIRCUIT USING BLOWN AND UNBLOWN FUSES

**Yoshihiro Takemae; Junji Ogawa, both of Tokyo; Yasuhiro Fujii, Yokohama; Tomio Nakano, Kawasaki; Takeo Tatematsu, Yokohama; Takashi Horii; Masao Nakano, both of Kawasaki, all of Japan and Norihisa Tsuge, deceased, late of Kamakura, Japan by Itaru Tsuge, Sachie Tsuge, heirs, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Apr. 10, 1984, Ser. No. 598,742**
**Claims priority, application Japan, Nov. 10, 1983, 58-209860**
**Int. Cl.[4] G11C 7/00**
**U.S. Cl. 365—200** **19 Claims**




1. A circuit for storing information by blown and unblown fuses, comprising:

first and second power supply terminals;

fuse circuit means, operatively connected between said first and second power supply terminals, said fuse circuit means comprising at least two fuses each of which is capable of taking one of blown and unblown states, said at least two fuses for storing information; and

information output means, operatively connected to said fuse circuit means, for providing an output representing the stored information by discriminating between the state in which all of said at least two fuses are unblown and the state in which at least one of said at least two fuses is blown.

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**4,592,026**

## MEMORY DEVICE RESISTANT TO SOFT ERRORS

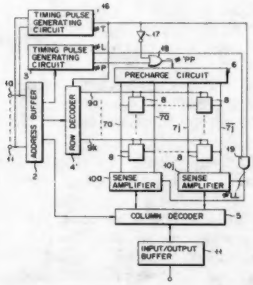
**Naohiro Matsukawa; Mitsuo Isobe, both of Yokohama, and Takayasu Sakurai, Tokyo, all of Japan, assignors to Shaibaura Denki Kabushiki Kaisha, Japan**

**Filed Dec. 23, 1983, Ser. No. 564,683**

**Claims priority, application Japan, Dec. 28, 1982, 57-227225**

**Int. Cl.[4] G11C *7/00, 11/40***

**U.S. Cl. 365—203** **3 Claims**




1. A memory device for reducing soft errors comprising:

a pair of bit lines for transferring data;

a plurality of memory cells connected to said bit lines;

a charging circuit coupled to said bit lines for charging said bit lines to a predetermined potential;

an address input terminal for receiving an address for said memory cells;

a first pulse generating circuit coupled to said address input terminal for generating a first pulse signal after said address changes, said first pulse signal including a plurality of first pulses each having a first predetermined pulse duration;

a second pulse generating circuit coupled to said address input terminal for generating a second pulse signal after said address changes, said second pulse signal including a plurality of second pulses having a second predetermined pulse duration longer than said predetermined pulse duration of said first pulse signal, said first pulses occurring during the pulse durations of said second pulses; and

a logic circuit connected to said first and second pulse generating circuits for driving said charging circuit during the duration of said first pulses and between said second pulses.

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**4,592,027**

## READ CONTROL CIRCUIT IN A READ ONLY MEMORY SYSTEM

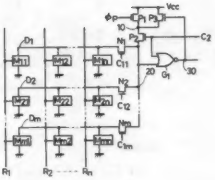
**Yoshifumi Masaki, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 8, 1984, Ser. No. 577,970**

**Claims priority, application Japan, Feb. 15, 1983, 58-24312**

**Int. Cl.[4] G11C *7/00***

**U.S. Cl. 365—203** **4 Claims**




1. A read control system for a semiconductor read only memory which includes a plurality of memory cells aligned in a matrix fashion, said read control system comprising:

data read lines commonly connected, in a parallel fashion, to the memory cells aligned in one dimension;

read out data output means connected to said data read lines;

first switching means interposed between said read out data output means and each of said data read lines for selecting one of said data read lines, said first switching means including a plurality of n-MOSFETs each of which includes,

a drain electrode connected to one of said data read lines;

a source electrode connected to said read out data output means; and

a gate electrode receiving a secondary column address signal;

charging means for charging the selected data read line to a desired level;

second switching means interposed between said charging means and said first switching means, said second switching means including a p-MOSFET which includes;

a source electrode connected to said charging means,

a drain electrode commonly connected to said source electrode of said plurality of n-MOSFETs included in said first switching means, and a gate electrode receiving a primary column address signal;

a plurality of row address lines each of which is commonly connected to the memory cells aligned in the other dimension; and

read means for selecting one of said plurality of row address lines after the charging operation conducted by said charging means in completed, thereby applying discharging current flowing through the selected memory cell and through the selected data read line to said read out data output means.

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**4,592,028**

## MEMORY DEVICE

**Satoshi Konishi, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Jun. 8, 1983, Ser. No. 502,338**

**Claims priority, application Japan, Jun. 9, 1982, 57-99002; Jun. 9, 1982, 57-99006**

**Int. Cl.[4] G11C *11/40***

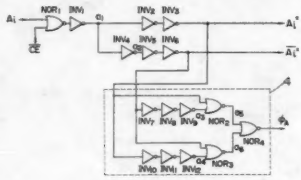
**U.S. Cl. 365—230** **19 Claims**

1. A memory device comprising:

a signal generating circuit means for receiving a first signal and producing second and third signals in response to said first signal, said second and third signals being delayed relative to said first signal, said second signal having the same logic level as said first signal, and said third signal

having an opposite logic level, said signal generating circuit means comprising:

a first circuit having an input terminal and an output terminal and a second circuit having an input terminal and an output terminal, said input terminals being connected together, said first and second signals being received in



said connected input terminals, each of said second and third signals being produced on at least one of said output terminals; and

a detector means to which are applied at least said second and third signals, thereby detecting the transition of said first signal.

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**4,592,029**

## ARRAY APPARATUS FOR READING-OUT A TWO-DIMENSIONAL CHARGE IMAGE

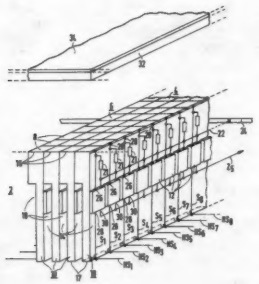
**Franz Altmann, Munich; Bernd Granz, Oberasbach, both of Fed. Rep. of Germany; Dieter Grenda, Milnerton, South Africa, and Ralph Oppelt, Herzogenaurach, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jun. 13, 1983, Ser. No. 503,798**

**Claims priority, application Fed. Rep. of Germany, Jun. 28, 1982, 3224026**

**Int. Cl.[4] G01S *15/89***

**U.S. Cl. 367—7** **16 Claims**



1. A device for reading-out a two-dimensional charge image, the device comprising an array formed of a plurality of stacked circuit boards, each circuit board having two flat sides and two narrow sides, one of the flat sides being provided with a recess extending in a longitudinal direction parallel to said narrow sides of said circuit board, said recess comprising a housing for electronic components having control lines which are arranged on at least one of the flat sides of the circuit boards, one of the narrow sides of each circuit board being provided with a plurality of electrodes arranged in a row, said narrow sides being arranged adjacent each other such that the adjacently arranged electrodes form a matrix of electrodes arranged in rows and columns, the apparatus further comprising:

a plurality of switchable amplifiers arranged adjacent each other in the longitudinal direction of each recess, each amplifier having a control line;

a plurality of connecting conductors of approximately equal length coupling respective ones of the electrodes with corresponding ones of said switchable amplifiers; and

a plurality of main control lines arranged on the narrow side of each circuit board opposite the electrodes in the direction of the columns of the matrix for connecting respective ones of the control lines of said switchable amplifiers disposed in the same column to one another.

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**4,592,030**

## METHOD OF SEISMIC EXPLORATION BY ACOUSTIC WELL LOGGING

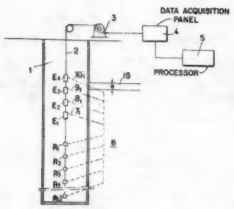
**Patricia Arditty, Le Chesnay; Georges Arens, Croissy sur Seine, and Philippe Staron, Mennecy, all of France, assignors to Societe Nationale Elf Aquitaine, Division Propriete Industrielle Tour Elf, Paris, France**

**Filed Sep. 28, 1982, Ser. No. 426,238**

**Claims priority, application France, Oct. 5, 1981, 81 18672**

**Int. Cl.[4] G01V *1/40***

**U.S. Cl. 367—27** **10 Claims**




1. Method of seismic exploration by acoustic well logging of geologic formations penetrated by a drilled well, said method consisting of

emitting and receiving various types of acoustic waves by emitting and receiving means arranged in said well, said means defining between them at least two acoustic paths of different length;

recording, for each emission of a plurality of emissions, the full waveform received by at least one of the receiving means;

marking, at the instant of the emission, and for each recording, the respective positions of the emitter-receiver pair which has given rise to said recorded trace;

effecting a velocity analysis of some of said recorded traces to determine an approximate value of the transit time of each type of wave being propagated in said formations, wherein said velocity analysis comprises; adjusting said some of said recorded traces mathematically to account for a range of estimated propogation speeds, said range being estimated based upon the types of geologic formations which might be present;

wherein on each trace, the approximate values of the transit times so-obtained are plotted so as to locate the said various types of waves which appear in the traces;

selecting a wave of interest from among the said various types of waves and for each type of wave of interest, selecting an event characteristic of the phase of the wave of interest in the trace, and determining the time corresponding to the appearance of this characteristic event in said trace so as to deduce the actual velocity of propogation of said wave of interest in the geologically formed layers inbetween the emitter-receiver pair which give rise to said trace;

gathering all the traces in pairs so that in a given pair the two acoustic paths corresponding to the two traces of said pair show a common end located on the same side in the drilled well and a non-common end facing a geologic layer of interest;

measuring in each pair of traces the difference of the time of arrival of the characteristic event selected for each type of

wave of interest and finally, computing, by means of this time difference and of the thickness of said geologic layer, the velocity of propogation of each type of wave if interest in this layer.

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**4,592,031**

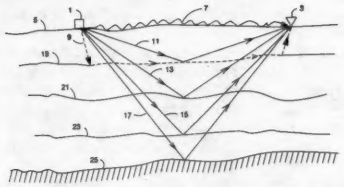
## PRECORRELATION FILTERING

**David C. Bradshaw, Houston; William C. Robinson, Alpine, and James R. Rossi, Humble, all of Tex., assignors to Standard Oil Company (Indiana), Chicago, Ill.**

**Continuation of Ser. No. 254,791, Apr. 15, 1981, abandoned, which is a continuation of Ser. No. 45,535, Jun. 4, 1979, abandoned. This application Oct. 18, 1983, Ser. No. 542,924**

**Int. Cl.[4] G01V *1/28***

**U.S. Cl. 367—45** **12 Claims**



1. A nonheterodyne method for discriminating reflected mapping signals from direct wave and ground roll signals in seismic data procurement for mapping subterranean geological structure comprising the steps of:

(a) generating a seismic signal with a variable frequency seismic source;

(b) varying the frequency of said variable frequency seismic source according to a time function during the period of a seismic data procurement run;

(c) transmitting the thus-varied seismic signal from the earth's surface to subterranean geological interfaces and producing reflected mapping signals, and also producing direct wave and ground roll signals;

(d) receiving the reflected mapping signals and the direct wave and ground roll signals with a seismic energy sensor;

(e) filtering the thus-received signals with a time-variable bandpass frequency filter to pass a spectrum of the received signals ' frequencies; and

(f) varying the pass frequency spectrum of said time variable bandpass frequency filter according to a delayed counterpart of said time function during said seismic data procurement run and passing a time variable frequency output signal discriminating reflected mapping signals from direct wave and ground roll signals.

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**4,592,032**

## METHODS OF PROCESSING GEOPHYSICAL DATA AND DISPLAYS OF GEOPHYSICAL DATA

**Gary M. Ruckgaber, Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.**

**Continuation of Ser. No. 231,699, Feb. 5, 1981, abandoned. This application May 24, 1984, Ser. No. 614,348**

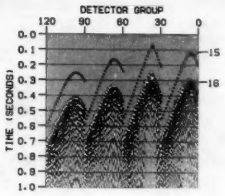
**Int. Cl.[4] G01V *1/00***

**U.S. Cl. 367—73** **24 Claims**

1. A method for processing one or more seismic signals to determine error in specifying the locations of sources relative to receivers comprising:

generating one or more first signals having a selected first time pulse event representative of assumed locations of sources relative to receivers according to a model of the assumed locations of sources relative receivers; and

determining error in specifing the assumed locations of sources relative to receivers by comparing one or more of said signals with one or more seismic signals having a




second time pulse event representative of the location of sources relative to receivers.

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**4,592,033**

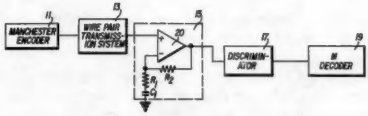
## APPARATUS FOR IMPROVING THE DATA TRANSMISSION RATE IN A TELEMETRY SYSTEM

**Charles L. Dennis, Richardson, Tex., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed May 2, 1983, Ser. No. 490,906**

**Int. Cl.[4] G01V *1/40*; H03G *3/00***

**U.S. Cl. 367—76** **7 Claims**




1. An apparatus for improving the transmission rate of a manchester encoded data signal comprising:

means for supplying a manchester encoded data signal having different primary frequency components;

an operational amplifier having inverting and non-inverting inputs and an output, said non-inverting input being connected to the output of said supplying means;

a first capacitor and a first resistor connected in series between a ground potential and the inverting input of said operational amplifier; and,

a second resistor connected between the inverting input of said operational amplifier and its output,

the transfer characteristic of the circuit formed by said operational amplifier, first and second resistances and capacitor producing an amplification of all primary frequency components of said manchester encoded data signal.

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**4,592,034**

## ACOUSTIC EMISSION SOURCE LOCATION ON PLATE-LIKE STRUCTURES USING A SMALL ARRAY OF TRANSDUCERS

**Wolfgang H. Sachse, Ithaca, N.Y., and Selcuk Sancar, Columbus, Ohio, assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.**

**Filed Nov. 15, 1982, Ser. No. 441,986**

**Int. Cl.[4] G01D *7/00*; G01S *3/80***

**U.S. Cl. 367—127** **17 Claims**

1. A small transducer array for omnidirectional monitoring of acoustic waves on a plate-like surface, comprising:

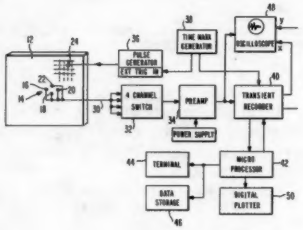
a surface to be monitored;

four substantially point receiver transducers acoustically coupled to said surface, each transducer being adapted to produce an output signal corresponding to received acoustic waves on said surface, said transducers forming an array on said surface wherein no three transducers are colinear, wherein said transducers do not lie on a circle, and wherein no two of said four transducers lie on a straight line which is parallel to the direction of a straight

line passing through the remaining two transducers, said transducer array having a maximum dimension that is less than or on the order of the wavelength of the acoustic waves be monitored;

circuit means responsive to output signals from said transducers for determining the location of the source of received acoustic waves, said circuit means including:

means for determining the time difference at each of said transducers between the arrival of a first selected characteristic feature of said acoustic waves and the arrival of a second selected characteristic feature of said acoustic waves;




means for determining from said time difference the distance from the transducers to the source of received acoustic waves;

means for determining the time delays between the arrival of any selected characteristic wave feature at a first of said transducers and each of the remaining three transducers; and

means for determining from said time delays, the direction of the source of the received acoustic waves with respect to the transducers.

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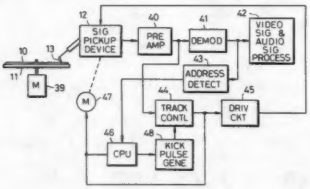
**4,592,035**

## INFORMATION SIGNAL TRACK SEARCH SYSTEM IN A ROTARY RECORDING MEDIUM REPRODUCING APPARATUS

**Yasuo Miyasho, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Japan**

**Filed Sep. 16, 1982, Ser. No. 419,033**
**Claims priority, application Japan, Sep. 18, 1981, 56-147241**
**Int. Cl.[4] G11B *21/08***
**U.S. Cl. 369—32** **6 Claims**




1. An information signal track search system in a rotary recording medium reproducing apparatus comprising carriage means, a reproducing transducer mounted on said carriage means and having a cantilever, said cantilever being provided with a reproducing element at a tip end thereof for scanning over tracks on a rotary recording medium and reproducing recorded signals from the tracks, said cantilever being resiliently supported at a part in the vicinity of a base end thereof so that said reproducing element is displaceable with respect to the base end of said cantilever, and driving means for moving the carriage means along a radial direction of the rotary recording medium, said rotary recording medium being recorded with an address signal indicating the position of each track, said track search system comprising:

address detecting means for constantly detecting the address signal from the signals reproduced by the reproducing element so as to detect an address of a track on which the reproducing element is located;

processing means for comparing a desired address of a desired track memorized therein and the detected address from said address detecting means and for controlling said driving means responsive to an address difference, said processing means controlling said driving means to move the carriage means in a first radial direction at a first high speed in response to said address difference, said processing means controlling said driving means to stop driving the carriage means in said first radial direction when said address difference becomes substantially equal to zero, said reproducing element lagging with respect to the base end of said cantilever due to friction between the reproducing element and the surface of the rotary recording medium while said carriage means moves in said first radial direction and, when said carriage means is no longer driven, said reproducing element undergoing a further movement in said first radial direction and overrunning said desired track owing to inertia of said carriage means and a resilient restoration force of said cantilever acting to overcome the lagging condition of said reproducing element; and;

kicking means for kicking the reproducing element in a second radial direction which is opposite to said first radial direction at a second high speed until said address difference becomes exactly equal to zero, said second high speed being smaller than said first high speed.

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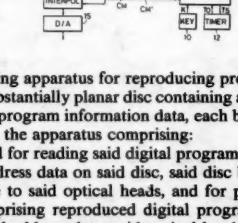
**4,592,036**

## DISC PLAYER WITH SEARCH NOISE SUPPRESSION

**Tsuneo Furuya, Tokyo, and Yoshizumi Inazawa, Yokohama, both of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed May 23, 1983, Ser. No. 497,404**
**Claims priority, application Japan, May 23, 1982, 57-87157; May 25, 1982, 57-88445**
**Int. Cl.[4] G11B *20/10, 20/24, 27/10***
**U.S. Cl. 369—32** **11 Claims**




1. A reproducing apparatus for reproducing program information from a substantially planar disc containing a plurality of blocks of digital program information data, each block including address data, the apparatus comprising:

an optical head for reading said digital program information data and address data on said disc, said disc being moveable relative to said optical heads, and for providing an output comprising reproduced digital program information data and address data, said optical head being selectively operable in a searching mode for locating predetermined address data associated with predetermined program information and in a playback mode for providing program information data for conversion into said predetermined program information;

processing circuit means for converting obtained information data into a program information output, said process-

ing circuit means cooperating with said optical head to obtain therefrom said reproduced program information data for conversion into said program information output;

detecting means for detecting said address data in said output of said optical head;

system controlling means for controlling said optical head when operating in said searching mode and for establishing said playback mode of said optical head in response to the detection of said predetermined address data by said detecting means, said system controlling means controlling movement of said optical head at the time of detection of said predetermined address data for providing a predetermined clearing period after said after said playback mode is established when said program information data in said output of said optical head is substantially without predetermined program information; and

noise-suppressing means including selectively actuable muting means for cooperating with said processing circuit means for substantially blocking the conversion by said processing circuit means of program information data into program information while said optical head means is in said searching mode and during a predetermined muting time after said predetermined address data is detected;

said clearing period being at least as long as said muting time, whereby any noise delayed by said conversion so as to be presented during said muting time is suppressed.

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**4,592,037**

## DEVICE FOR DISPLACING A PICKUP HEAD IN MULTI-AXIAL DIRECTIONS

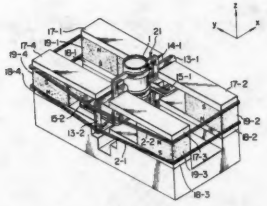
**Hideo Ohnuki, Yokohama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 24, 1981, Ser. No. 324,442**

**Claims priority, application Japan, Nov. 28, 1980, 55-168253; Dec. 5, 1980, 55-170971**

**Int. Cl.[4] G11B *7/00***

**U.S. Cl. 369—44** **12 Claims**



**1.** A device for enabling displacement of an information signal pickup holder in multi-axial directions comprising:

an information signal pickup holder for supporting an information signal pickup means;

means for generating lines of magnetic force in two directions perpendicular to each other;

a first coil and a second coil having a first path of current and a second path of current respectively disposed in one direction of said lines of magnetic force and perpendicular to each other in a plane perpendicular to said one direction of said lines of magnetic forec, said first coil and said second coil being secured to said information signal pickup holder;

a third coil having a third path of current disposed in the other direction of said lines of magnetic force and parallel to one of said first path of current and said second path of current in a plane perpendicular to said other direction of said line of magnetic force, said third coil being secured to said information signal pickup holder; and

support means for supporting said information signal pickup holder for enabling displacement in all the coordinate axial directions of three coordinate axes perpendicular to one another;

whereby said information signal pickup holder can be mutually exclusively for displacement in the three axial directions perpendicular to one another by the interaction of said coils upon energization.

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**4,592,038**

## OPTICAL REPRODUCING APPARATUS

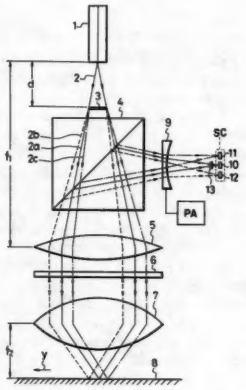
**Shigeo Kubota, and Kenji Shintani, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Sep. 26, 1983, Ser. No. 535,850**

**Claims priority, application Japan, Sep. 28, 1982, 57-169367**

**Int. Cl.[4] G11B *7/00, 21/10***

**U.S. Cl. 369—44** **4 Claims**




**1.** An optical reproducing apparatus comprising:

a semiconductor laser light source emitting a divergent laser light beam;

an objective lens mounted in spaced-apart relation to said semiconductor laser light source;

first, second and third photodetectors respectively mounted in spaced-apart relation to said semiconductor laser light source and objective lens;

a beam splitter mounted between said semiconductor laser light source and said objective lens;

a diffraction grating of a phase type mounted between said semiconductor laser light source and said, beam splitter, said diffraction grating separating said laser light beam from said semiconductor laser light source into zero, plus first and minus first order diffracted beams;

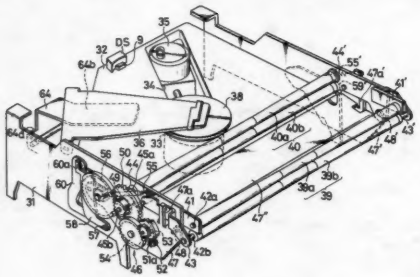
said objective lens focussing said diffracted beams onto a reflective optical record medium, and said beam splitter directing said zero, plus first and minus first order diffracted beams as reflected by said reflective optical record medium onto said first, second and third photodetectors, respectively; and

a concave lens for diverging said diffracted beams, said concave lens being mounted between said photodetectors and said beam splitter and facilitating positioning of said photodetectors so that a tracking error signal can be obtained by calculating the difference between the detected outputs of said second and third photodetectors.

## 4,592,039
## DISC PLAYER

Tsutomu Toyoguchi, Tokyo, and Yoshiro Watanabe, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 25, 1984, Ser. No. 664,850
Claims priority, application Japan, Oct. 27, 1983, 58-201586; Nov. 18, 1983, 58-217384; Dec. 26, 1983, 58-251875
Int. Cl.[4] G11B *1/00, 17/04*
U.S. Cl. 369—75.2 11 Claims



1. A disc player comprising a housing having a front wall with an elongated opening extending laterally thereacross for insertion of a disc therethrough into said housing; a spindle motor in said housing connected to a rotatable disc table disposed horizontally at a level below said elongated opening; a pair of upper and lower rollers extending laterally within said housing between said front wall and said disc table, said upper roller being disposed at a level above said elongated opening so as to be engageable from above with a disc inserted through said opening, said lower roller being disposed below said upper roller, each of said upper and lower rollers having relatively large diameter end portions at the opposite ends thereof and tapering gradually from said large diameter end portions to a relatively small diameter portion centered therebetween; means mounting said lower roller for substantially vertical movement and being biased upwardly for normally urging said lower roller against said upper roller at said end portions thereof so that a disc inserted through said opening is engaged from above and below, at the periphery of the inserted disc, by said upper and lower rollers, respectively, so long as said lower roller is free to be normally urged upwardly; drive means for rotating said lower roller in a direction to cause the inserted disc engaged by said upper and lower rollers to be displaced therebetween to a position centered over said disc table; stop means limiting the movement of the disc by said upper and lower rollers at said position centered over the disc table; and means powered by said drive means in response to engagement of a disc with said stop means for moving said lower roller downwardly to a position below said level of the disc table for depositing the disc on said disc table, said drive means continuing to rotate said lower roller during the downward movement thereof for ensuring maintenance of the centered relation of the disc to said table.

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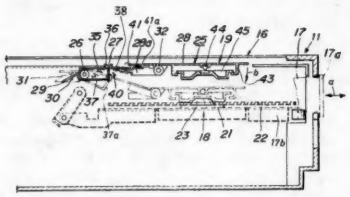
## 4,592,040
## DISC-RECORD PLAYER WITH A PRESSURE LEVER CARRYING A PRESSURE MEMBER

Kiyoshi Ohsaki, Tokyo, Japan, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 2, 1984, Ser. No. 637,083
Claims priority, application Japan, Aug. 24, 1983, 58-129827[U]
Int. Cl.[4] G11B *1/00, 17/04, 25/04*
U.S. Cl. 369—77.1 8 Claims

1. A disc-record player comprising a frame, a turntable having a playing side and mounted for rotation in said frame, a pressure lever pivotally connected to the frame, a pressure member carried and movable by the pressure lever from an inoperative position towards the turntable into an operating position, and a ball arranged between the pressure lever and the pressure member; in the operating position the ball and the pressure member being substantially coaxial with the turntable, the pressure lever exerting pressure on the pressure member through the ball, and the pressure member urging a disc, which has been placed into the player, against the playing side of the turntable,



characterized in that the pressure lever is articulated, and comprises an arm portion pivotally connected to the frame about a first pivot axis, and a pressure portion pivotally connected to the arm portion about a second pivot axis parallel to said first pivot axis,

said pressure member is carried by said pressure portion, and the player includes means for causing the pressure member to lie substantially parallel to the turntable playing side both in the inoperative and in the operating positions.

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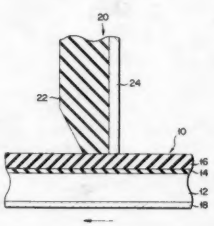
## 4,592,041
## HEAD FOR RECORDING AN INFORMATION SIGNAL IN AND REPRODUCING THE SAME FROM A SEMICONDUCTOR RECORDING MEDIUM

Shigeo Senzaki, Yokohama; Jun-ichiro Ikeuchi; Toshikazu Matsui, both of Tokyo, and Norikazu Sawazaki, Yokohama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Nov. 15, 1983, Ser. No. 551,933
Claims priority, application Japan, Nov. 29, 1982, 57-207702
Int. Cl.[4] G11B *9/00*
U.S. Cl. 369—126 14 Claims



1. A head for recording an information signal in and reproducing the same from a semiconductor recording medium comprising:

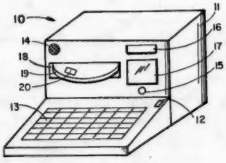
an electrode stylus having a lower hardness than that of a surface medium which constitutes said semiconductor recording medium, said electrode stylus relatively sliding on the semiconductor recording medium, and recording information being recorded and reproduced through said electrode stylus; and

a nonconductive supporting substrate, provided on the side surface of said electrode stylus, for supporting the electrode stylus, a hardness of said supporting substrate being lower than the hardness of said electrode stylus.

## 4,592,042
## RECORD CARD TRANSDUCING APPARATUS AND METHOD

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840, and Christian Grund, 707 L. Eagle Heights, Madison, Wis. 53705

Filed Feb. 16, 1983, Ser. No. 467,139
Int. Cl.[4] G11B *25/04, 23/00*
U.S. Cl. 369—258 20 Claims

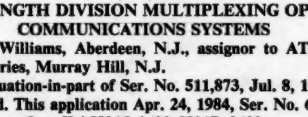



1. A record card transducing apparatus comprising:
a first support,
a rotatable second support rotatably supported on said first support,
record card retaining means supported by said second support for receiving, predeterminately locating and supporting a rectangular shaped record card having a plurality of parallel circular record tracks, which circular record tracks are centered at the axis of rotation of said rotatable second support when said record card is predeterminately located on said second support by said retaining means and wherein the recording surface of said record card is disposed, when said card is so located on said support in a plane which is normal to the axis of rotation of said second support and the circular paths of said circular record tracks extend beyond the borders of said record card,
power means for rotating said rotatable support about a fixed axis,
scanning means including transducing means supported by said first support, and
means for energizing and causing said transducing means to scan a selected track of said plurality of circular record tracks of a card which is predeterminately supported and retained by said second support and is rotating therewith to allow said transducing means to selectively transduce information with respect to said selected circular record track of a record card supported by said second support.

## 4,592,043
## WAVELENGTH DIVISION MULTIPLEXING OPTICAL COMMUNICATIONS SYSTEMS

Gareth F. Williams, Aberdeen, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 511,873, Jul. 8, 1983, abandoned. This application Apr. 24, 1984, Ser. No. 603,405
Int. Cl.[4] H04J *1/00;* H04B *9/00*
U.S. Cl. 370—3 92 Claims

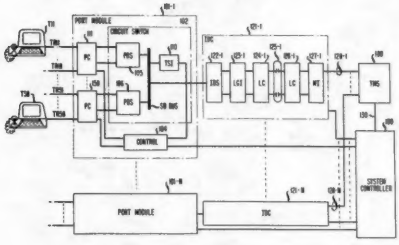



1. A wavelength division multiplexing optical communications system comprising an optical waveguide and a device comprising a waveguide resonator; a photodetector; said resonator being optically evanescently coupled to said optical waveguide and optically coupled to said photodetector; an intracavity element optically coupled to said resonator; and a control circuit element to tune said resonator to a desired frequency.

## 4,592,044
## APPARATUS AND METHOD FOR CHECKING TIME SLOT INTEGRITY OF A SWITCHING SYSTEM

James J. Ferenc, Boulder, Colo., assignor to AT&T Information Systems Inc., Middletown, N.J.

Filed May 22, 1984, Ser. No. 613,049
Int. Cl.[4] H04J *1/16, 3/14;* H04B *3/46;* G06F *7/34*
U.S. Cl. 370—13 14 Claims




1. A time slot integrity circuit adapted for connection to a time mutiplexed communication system for checking the time slot ordering of data words in a data frame, said integrity circuit comprising
means for transmitting over communication apparatus N first type data frames each including multiple data words followed by a second type data frame including multiple data words with each consecutive data word having a predetermined bit which is a consecutive bit of a pseudo random binary sequence, and
means for checking said predetermined bit of each consecutive data word of said second type data frame received over said communication apparatus from said transmitting means against an associated consecutive bit of said pseudo random binary sequence and generating an error signal when any said predetermined bit of any of the received data words of said second type data frame differs from the associated consecutive bit of said pseudo random binary sequence.

## 4,592,045
## CIRCUIT FOR THE SUBSCRIBER TERMINATION IN AN INTEGRATED SERVICES DIGITAL NETWORK

Oswald Fundneider, Puchheim, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

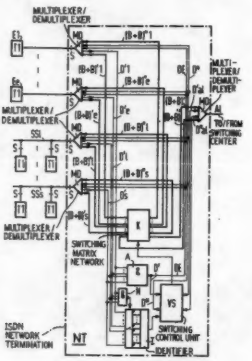
Filed May 3, 1984, Ser. No. 607,123
Claims priority, application Fed. Rep. of Germany, May 5, 1983, 3316492
Int. Cl.[4] H04Q *11/04;* H04J *3/12;* H04M *3/00*
U.S. Cl. 370—58 5 Claims

1. A circuit for an integrated services digital network having a network termination connected through respective S-interfaces to a plurality of terminal lines, each terminal line having a B+B+D channel structure for each transmission direction, and said terminal lines each having one or more subscriber terminals connected thereto, said network termination being connected to a switching center via a subscriber line and having multiplexer/demultiplexer means associated with each terminal line and with said switching center for combining and fanning said B and D channels, said circuit comrising:
a switching matrix interconnected between said multiplexer/demultiplexer means associated with each terminal line and said multiplexer/demultiplexer means associated with

said switching center, said switching matrix connecting the B channels of said terminal lines to each other or individually to said switching center;

a switching control means connected to said switching matrix for controlling the operation thereof for selecting said connections;

an AND means having inputs respectively connected through said multiplexer/demultiplexer means associated with each terminal line to the D-channels of each terminal line and having an output connected to said switching control means through a common D-channel and to said multiplexer/demultiplexer means associated with each of




said terminal lines through a common D-echo channel, said D-echo channel supplying a signal to each of said terminal lines indicating a signal on said common D-channel thereby preventing access of remaining terminal lines to said switching matrix network; and

an identifier means having inputs connected to said D-channels for each terminal line in a transmission direction towards said switching control means and having an output connected to said switching control means for transmitting information thereto identifying from which S-interface the signal on said common D-channel has been transmitted.

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**4,592,046**

## SUBSCRIBER'S CIRCUIT FOR TIME DIVISION SWITCHING SYSTEM

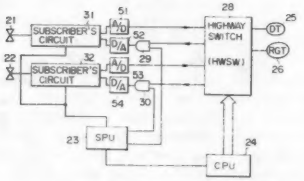
**Yoshihiro Kawata, Saitama; Tsunetaka Sakata, Hachioji; Teruo Matsufuji, Koganei; Tetsuro Inomata, Kawasaki, and Hiroyuki Miyashita, Koganei, all of Japan, assignors to Iwasaki Tsushinki Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 2, 1984, Ser. No. 595,668**

**Claims priority, application Japan, Mar. 13, 1983, 58-55628; Apr. 1, 1983, 58-57035**

**Int. Cl.⁴ H04Q** *11/04;* **H04J** *3/12;* **H04M** *3/00, 1/00*

**U.S. Cl. 370—58** **2 Claims**




1. A subscriber's circuit for a time division switching system which performs switching of speech channels by a highway switch inserted in a highway, comprising:

hook information detecting means for detecting hook information,

dial information detecting means for detecting dial information,

blocking means connected to said hook information detecting means for blocking a speech sending signal digitalized in a PCM format, and

control means provided so as to connect to said highway switch, said hook information detecting means said dial information detecting means and said blocking means so that when the hook information detecting means and the dial information detecting means detect the hook information and the dial information, respectively, delivery of the PCM speech sending signal to the hgihway is prevented by the blocking means for a fixed period of time, and so that the highway is controlled to switch the speech channel, thereby removing a click tone generated by dialing.

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**4,592,047**

## CIRCUIT FOR THE SUBSCRIBER TERMINATION IN AN INTEGRATED SERVICES DIGITAL NETWORK

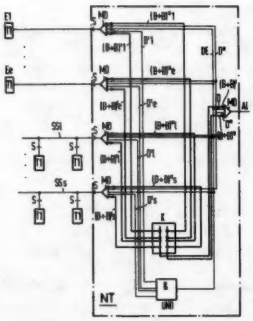
**Oswald Fundneider, Puchheim, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed May 7, 1984, Ser. No. 607,625**

**Claims priority, application Fed. Rep. of Germany, May 5, 1983, 3316470**

**Int. Cl.⁴ H04Q** *11/04;* **H04J** *3/12*

**U.S. Cl. 370—58** **3 Claims**



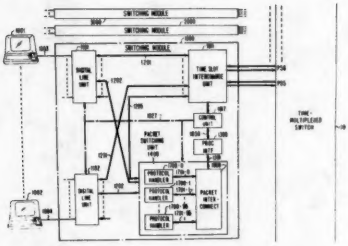

1. A circuit for an integrated services digital network having a network termination connected through respective S-interfaces to a plurality of terminal lines, each terminal line having a B+B+D channel structure for each transmission direction, and said terminal lines each having one or more subscriber terminals connected thereto, and means for combining and fanning said B and D channels, said network termination being connected to a switching center via a subscriber line, said circuit comprising:

AND gate means having a plurality of inputs each connected to the D-channel of individual ones of said terminal lines, means for connecting the output of said AND gate means to said switching center, means for connecting the output of said AND gate means to each of said terminal lines over a D-echo channel, and circuit means for connecting the B-channels of each of said terminal lines to the B-channel of said switching center.

## 4,592,048
## INTEGRATED PACKET SWITCHING AND CIRCUIT SWITCHING SYSTEM

**Mark W. Beckner, Morristown, N.J.; James A. Davis, Glen Ellyn, Ill.; Eric J. Gausmann, Long Valley, N.J.; Thomas L. Hiller, Berkley, Ill.; Philip D. Olson, Rohnert Park, Calif., and Gilbert A. Van Dine, West Chicago, Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed May 3, 1984, Ser. No. 606,937**
**Int. Cl.⁴ H04Q *11/04;* H04J *3/12***
**U.S. Cl. 370—60** **39 Claims**



1. A switching system comprising circuit switching means for providing circuit-switched communication channels among a plurality of user terminals,

control means for controlling the establishment of circuit-switch communication channels by said circuit switching means and

packet switching means comprising a control packet switching node connected to said control means, a plurality of user packet switching nodes each connectible to associated ones of said user terminals, and packet interconnect means for interconnecting said control packet switching node and each of said user packet switching nodes to provide signaling channels between said control means and said user terminals.

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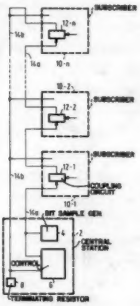
## 4,592,049
## METHOD OF AND ARRANGEMENT FOR CONTROLLING ACCESS TO A TIME-DIVISION MULTIPLEX MESSAGE TRANSMISSION PATH

**Ulrich Killat, Hamburg; Dieter Riekmann, Pinneberg, and Rolf Stecher, Hamburg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jan. 10, 1984, Ser. No. 569,650**
**Claims priority, application Fed. Rep. of Germany, Jan. 10, 1983, 3300531; Oct. 13, 1983, 3337289**
**Int. Cl.⁴ H04J *3/00, 3/16***
**U.S. Cl. 370—87** **18 Claims**

1. A method for controlling subscriber station access to a time-division multiplex message transmission path in which a common central control and a plurality of subscriber stations are connected in a recirculatory circuit and in which the central control produces cyclically recurring frames of a predetermined number of channels defined by a corresponding number of binary words each having a predetermined number of bits; at least one such word being assigned as a signaling word in each frame, a variable contiguous portion of the said number of words being allocated as narrow-band channels through each of which a word may be transmitted in each frame and a further variable contiguous portion of the said number of words being reserved to form a high-rate channel through which data packets may be transmitted in sequences of consecutive words; such method comprising the steps of: dividing each frame into several groups of words, and assigning particular words as signaling words which identify each of such groups; causing the central control to continuously transmit a predetermined first bit sample comprising a specified number of bits in the signalling words of the groups to which narrow band channels are assigned; prior to transmission by a subscriber station of a data packet in the high-rate channel, causing such subscriber station to transmit, in a signaling word which does not contain said first bit sample, a bit sample comprising a specified number



of bits and which is individually assigned to such subscriber station; and upon subsequent return through said recirculatory loop to such subscriber station of said assigned bit sample, unaltered, in the the signaling word in which it was transmitted, causing such subscriber station to transmit said data packet in the group of words identified by such signaling word.

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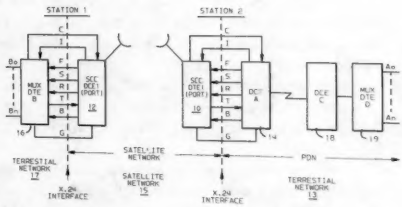
## 4,592,050
## APPARATUS AND METHOD FOR PROVIDING A TRANSPARENT INTERFACE ACROSS A SATELLITE COMMUNICATIONS LINK

**Joseph M. Bensadon, Germantown, Md., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 29, 1984, Ser. No. 594,656**
**Int. Cl.⁴ H04J *3/06, 3/00;* H04L *7/00;* H03K *1/17***
**U.S. Cl. 370—103** **1 Claim**



1. In an integrated communications network including a transmitting terrestrial portion for transmitting messages delineated by framing characters and having a first bit timing cycle, a satellite communications portion with a first ground station serially connected to said transmitting terrestrial portion, for receiving said messages from said transmitting terrestrial portion and retransmitting them with a universal timing cycle characterized by a periodic universal clock pulse over a satellite link to a second ground station and a receiving terrestrial portion serially connected to said second ground station of said satellite communications portion, for receiving said messages from said second ground station and retransmitting them, a system for synchronizing said receiving terrestrial portion with said transmitting terrestrial portion so that said messages transmitted by said receiving terrestrial portion are delineated by said framing characters and have said first bit timing cycle, comprising:

a first counter in said first ground station, connected to said

transmitting terrestrial portion, for generating a first periodic signal characterizing said first bit timing cycle;

a second counter in said first ground station, connected to a clock source for said universal timing cycle, for accumulating clock pulses from said universal timing cycle;

a difference means connected between said first counter and said second counter and having control input connected to a source of said universal clock pulse, for outputting a difference value between the accumulated count in said second counter at the instant of occurrence of said first periodic signal, and the accumulated count in said second counter at the instant of occurrence of said universal clock pulse, said difference value characterizing the degree of bit synchronization between said transmitting terrestrial portion and said satellite communication portion;

a transmitting means connected to said transmitting terrestrial portion and including a transmit memory, a write pointer, and a read pointer, for sequentially storing at a location corresponding to said write pointer, consecutive messages received from said transmitting terrestrial portion and for sequentially transmitting messages from locations addressed by said address pointer, said transmitting means including a control input connected to said difference means;

said transmitting means transmitting a first control word having a first code indicating that messages are accumulating in said transmit memory and that an extra message will be transmitted to compensate for said accumulation, in response to said difference means indicating that said first bit timing cycle is relatively fast;

said transmitting means transmitting said first control word having a second code indicating that the number of messages in said transmit memory is depleting and that a message will be omitted in transmission to compensate for said depleting, in response to said difference means indicating that said first bit timing cycle is relatively slow;

means at said second ground station to receive said first control word and in response thereto, to anticipate the receipt of an extra message if said first control word has said first code and alternately to anticipate the omission of the receipt of a message if said first control word has said second code;

a framing character detector in said first ground station, connected to said transmitting terrestrial portion, for detecting the occurrence of a framing character delineating a message;

said difference means including an input connected to said write pointer and an input connected to said read pointer and having a second control input connected to said framing character detector, for outputting a second difference value between the address stored in said write pointer at the instant of occurrence of said first periodic signal and the address stored in said read pointer at the instant of occurrence of said universal clock pulse, said second difference value characterizing the relative position of said frame character with respect to said universal clock pulse;

said transmitting means transmitting a second control word characterizing said second difference value;

means at said second ground station for receiving said second control word and in response thereto, adjusting the position of said framing character with respect to said universal clock pulse;

whereby said messages at said receiving terrestrial portion are delineated by said framing characters and are synchronized with said first bit timing cycle.

**4,592,051**

## ACTIVATION IN A DIGITAL SUBSCRIBER CONNECTION

**Hans-Jörg Frizlen, Trångsund, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden**

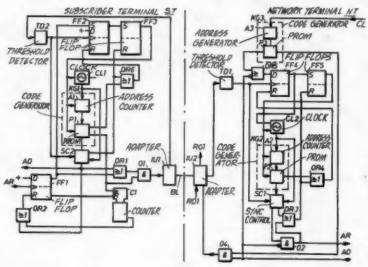
**PCT No. PCT/SE83/00449, § 371 Date Jun. 29, 1984, § 102(e) Date Jun. 29, 1984, PCT Pub. No. WO84/02815, PCT Pub. Date Jul. 19, 1984**

**PCT Filed Dec. 14, 1983, Ser. No. 626,869**

**Claims priority, application Sweden, Dec. 30, 1982, 8207518**

**Int. Cl.[4] H04J** *3/06*

**U.S. Cl. 370—103** **4 Claims**




1. In a telecommunication system including a subscriber terminal with a local clock connected via a TDM bus to a network terminal with a local clock in turn connected via a subscriber line to a line terminal connected to a central clock of the master station with which the line terminal communicates, the method of activating the subscriber terminal in a digital subscriber connection from the subscriber terminal side comprising the steps of transmitting from the subscriber terminal an activation request in the form of at least one binary coded information in synchronism with the local clock via the TDM bus to the network terminal for temporarily synchronizing the local clock of the network terminal to the local clock of the subscriber terminal, in response thereto the network terminal transmitting an activation request in the form of an asynchronous serial bit flow via the subscriber line to the line terminal, in response to the activation request from the network terminal, the line terminal transmitting an activation request signal to the master station, the master station in response to the receipt of the activation request signal transmitting an activation order signal to the line terminal, in response to the activation order signal the line terminal transmitting an activation order in the form of a continuous cyclic bit flow and a synchronizing signal to the network terminal for synchronizing a local clock therein to the central clock, and the network terminal in response thereto transmitting the activation order in the form of bit bursts and the synchronizing signal via the TDM bus to the subscriber terminal for activating the terminal and synchronizing the local clock to the central clock whereby a communication loop is established between the subscriber terminal-the network terminal-the line terminal-the network terminal-and the subscriber terminal.

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**4,592,052**

## METHOD OF TESTING BUBBLE MEMORY DEVICES

**Seiichi Iwasa, Sagamihara, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Dec. 12, 1983, Ser. No. 560,172**

**Claims priority, application Japan, Dec. 27, 1982, 57-234834**

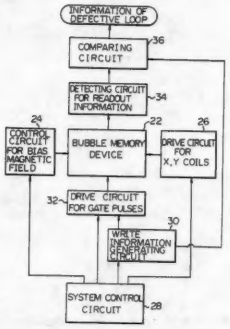
**Int. Cl.[4] G06F** *13/00;* **G01R** *33/12*

**U.S. Cl. 371—21** **15 Claims**

1. A method of testing a bubble memory device having a plurality of minor loops and an operating region, the method comprising the steps of:

(a) dividing data to be written into the bubble memory, into a plurality of blocks and writing this data into the bubble memory under different operating conditions for respective ones of said blocks;

(b) operating said bubble memory device sequentially under different operating conditions within said operating region for respective ones of said blocks; and




(c) detecting a defective minor loop by reading the data blocks stored in the bubble memory under different operating conditions for respective ones of said blocks and comparing the read data with the data to be written into the bubble memory.

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**4,592,053**

## PROGRAMMABLE CONTROLLER

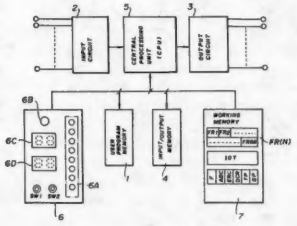
**Toshimi Matsuura, Nagaokakyo, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed Feb. 17, 1983, Ser. No. 467,377**

**Claims priority, application Japan, Feb. 19, 1982, 57-25727; Feb. 24, 1982, 57-28571; Mar. 17, 1982, 57-42337; Mar. 24, 1982, 57-47027**

**Int. Cl.[4] G06F *11/32***

**U.S. Cl. 371—29** **6 Claims**




1. A programmable controller comprising:

a user program memory for storing user programs including an abnormality detection program;

an input circuit for receiving input data;

an output circuit for sending out output data;

an input/output memory for storing input/output data corresponding to said input data received by said input circuit and said output data sent out by said output circuit;

a central processing unit, including:

(a) instruction execution means wherein instruction of said user programs stored in said user program memory are executed in sequence at high speed and wherein operational processing is carried out in accordance with said input/output data stored in said input/output memory,

(b) input renewal means for writing said input data of said input circuit in a predetermined area of said input/output memory, and

(c) output renewal means for setting said output data of said input/output memory in said output circuit;

working memory means operatively coupled to said central processing unit; and

operating unit means, including:

(i) display control means for controlling the display of abnormality information detected during the execution of said abnormality detection program by said central processing unit, and

(ii) display means for displaying said detected abnormality information in accordance with said display control means;

said working memory including abnormality flags, an address counter which detects a flag condition and addresses each of the abnormality flags each time a cycle of said user program is executed by said instruction execution means, a fault display flag which is set when an abnormality flag is detected and which is reset by a reset switch, and a display control register for storing the number of each abnormality flag and for causing said display control means to issue commands to said display means for displaying and storing the number and address of each of said detected abnormality flags in sequence each time an advance operation is called for by an advance switch, thereby displaying the numbers of the abnormality flags.

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**4,592,054**

## DECODER WITH CODE ERROR CORRECTING FUNCTION

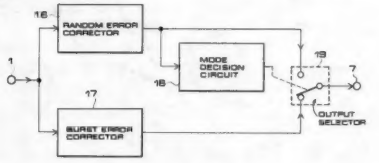
**Toshihiko Namekawa; Masao Kasahara; Kinichiro Tokiwa; Tohru Inoue, all of Osaka, and Shigeru Okamura, Hyogo, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 29, 1983, Ser. No. 527,480**

**Claims priority, application Japan, Oct. 22, 1982, 57-186375; Feb. 7, 1983, 58-25598**

**Int. Cl.[4] G06F *11/10***

**U.S. Cl. 371—39** **7 Claims**




1. A binary code decoder comprising;

first correcting means for correcting random errors up to a predetermined number of bits in received binary codes,

second correcting means for correcting burst errors more than said predetermined number of bits and up to a maximum burst error correcting capability of the code in said binary codes,

decision means for checking code errors in the correction output signal from said first correcting means to provide a check resultant signal, and

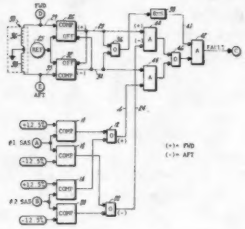
selecting means which selects either output from said first or second correcting means in accordance with said resultant signal from said decision means indicating absence or presence, respectively, of code errors in the correction output signal from said first correcting means.

4,592,055

## OUTER-LOOP MONITOR FOR AIRCRAFT AUTOMATIC FLIGHT CONTROL SYSTEM

William C. Fischer, Monroe; Stuart C. Wright, Milford, and David J. Verzella, Guilford, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 2, 1983, Ser. No. 490,644
Int. Cl.[4] G05D 1/00; G06F 11/30
U.S. Cl. 371—62 1 Claim



1. A monitor for providing a fault signal indicative of a failure in a position control system having an inner-loop actuator positionable in response to an inner-loop error signal over a limited range of positions which is a fraction of a full range of control system positions, means for providing the inner-loop error signal as a function of the difference between the actual inner-loop actuator position and a dictated inner-loop actuator position, means for providing an outer-loop command signal, which is a pulse, when the inner-loop error signal is indicative of at least a substantial portion of the limited range of inner-loop actuator positions, and an outer-loop actuator, positionable over the full range of control system positions and connected to the inner-loop actuator for adjusting the limited range of the inner-loop actuator in response to the outer-loop command signal pulses within the full range so that the inner-loop actuator is positionable over the full range of positions, said monitor comprising:

means (46) for providing an intermediate fault signal when the sense of the outer-loop command signal (D,E) disagrees with the sense of the inner-loop error signal (A,B);

means (38) for providing a limited time signal at the onset of an outer-loop command signal pulse and for a predetermined limited time thereafter, said limited time being of duration less than that of the pulse; and

means (42) for providing the fault signal (C) in response to the intermediate fault signal when the limited time signal is also present.

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4,592,056

## RESONANT PHOTON PUMPING MECHANISMS FOR A PLASMA X-RAY LASER

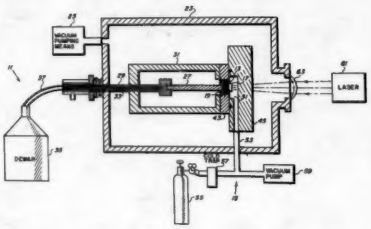
Raymond C. Elton, Potomac, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 10, 1984, Ser. No. 569,686
Int. Cl.[4] H01S 3/30
U.S. Cl. 372—5 11 Claims

1. An amplified spontaneous emission x-ray laser comprising:

means for generating a plasma of neon-like sulfur ions $S^{6+}$ which radiate on a 3d-2p transition; and

means for generating a plasma of lithium-like neon ions $Ne^{7+}$ which absorb on a 2s-5p absorption transition, said neon ion plasma being generated in close proximity to said sulfur ion plasma in order to obtain pumping radiation from said sulfur ion plasma, wherein said neon-like sulfur ion 3d-2p transition is resonant with said lithium-like neon ion 2s-5p absorption transition to create a population inversion in said plasma of neon ions to provide quasi-cw




lasing of said neon ion plasma at x-ray wavelengths between 1A and 700A by amplified spontaneous emission.

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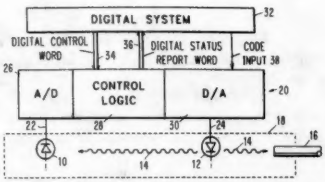
4,592,057

## VERSATILE DIGITAL CONTROLLER FOR LIGHT EMITTING SEMICONDUCTOR DEVICES

Liam D. Comerford, Carmel, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 246,804, Mar. 23, 1981. This application Mar. 29, 1982, Ser. No. 362,936
Int. Cl.[4] H01S 3/30
U.S. Cl. 372—8 17 Claims




1. A control circuit for a light emitting semiconductor device, comprising:

a light emitting semiconductor device;

means for sensing the light output from said light emitting semiconductor device;

means responsive to said sensing means for producing a digital representation of an amplitude of the actual light output of said light emitting semiconductor device;

control logic for generating a digital output signal representing a drive current for said light emitting semiconductor device; and

means converting said digital output signal into drive current for said light emitting semiconductor device, said control logic comparing said digital representation of the actual amplitude of the light output with a digital representation of a desired amplitude for the light output and gradually changing said digital output signal so as to reduce the difference therebetween.

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4,592,058

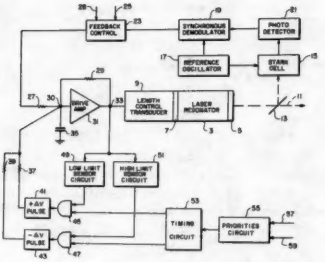
## FREQUENCY STABILIZED LASER

Robert J. Mongeon, S. Windsor, and Robert W. Henschke, East Hampton, both of Conn., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 10, 1984, Ser. No. 639,558
Int. Cl.[4] H01S 3/13
U.S. Cl. 372—32 6 Claims

1. A frequency stabilized laser comprising a resonator having a given optical output frequency, said resonator comprising

a pair of opposing end mirrors which define a laser cavity having a length which varies with temperature, one of said mirrors being the output mirror and the other a moveable mirror, a cavity length-controlling transducer attached to said moveable mirror and having a predetermined travel limit, a frequency control servo loop including means providing a frequency reference, means applying a sample of the output of said laser to said frequency reference means, said frequency reference means providing an optical error signal, means for converting said optical error signal to an electrical signal, a low pass filter having a cutoff frequency much lower than the resonant frequency of said transducer and attached mirror, means applying said electrical signal to said low pass filter, a drive amplifier receiving the output of said low pass filter and applying an amplified output to said transducer to vary the spacing between said mirrors in such a direction as to reduce said error signal toward zero, said frequency control servo




loop including high and low limit sensor circuits both connected to said transducer, said low limit sensor circuit providing a first output signal when said transducer approaches the lower limit of its travel, and means connected to said low limit sensor to generate a positive voltage pulse in response to said first output signal, said high limit sensor circuit providing a second output signal when said transducer approaches the upper limit of its travel, and means connected to said high limit sensor to generate a negative voltage pulse in response to said second output signal, and means to apply said positive and negative voltage pulses to the input of said drive amplifier, said voltage pulses having amplitudes sufficient to rapidly move said transducer by an integral member of half wavelengths of said optical output frequency toward the midrange of its travel, and wherein the duration of said voltage pulses is much lower than the reciprocal of the cut off frequency of said servo control loop.

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**4,592,059**

## LASER DIODE WITH SIMPLIFIED ADJUSTMENT DURING ASSEMBLY

**Heinz Westermeier, Neubiberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Aug. 13, 1984, Ser. No. 640,161**

**Claims priority, application Fed. Rep. of Germany, Aug. 23, 1983, 3330392**

**Int. Cl.⁴ H01S *3/045***

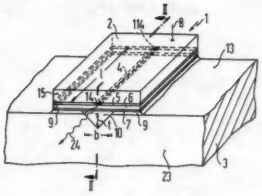
**U.S. Cl. 372—36** **5 Claims**

1. A combination laser diode and heat sink assembly comprising:

a semiconductor chip in which said laser diode is realized, said semiconductor chip having a strip-shaped laser-active zone, a radiation exit port in an end face of said chip, and at least one contact layer;

a solder layer disposed between said chip and said heat sink for mechanically connecting said chip and said heat sink, said chip being disposed with said contact layer adjacent said solder layer; and

said heat sink having an empty groove therein and said chip being mounted on said heat sink with said strip-shaped laser-active zone parallel to said groove such that said radiation exit port is disposed above said groove, said



groove having dimentions for permitting laser radiation emitted with divegence angle from said radiation exit port not to impinge on said heat sink even if said end face containing said radiation exit port being recessed from an edge of said heat sink up to 20 micrometers, said solder layer extending only up to the edges of said groove.

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**4,592,060**

## SEMICONDUCTOR LASER WITH ACTIVE LAYER HAVING REDUCED STRESS

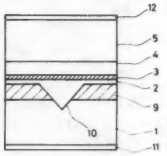
**Toshiro Hayakawa, Nara; Nobuyuki Miyauchi, Tenri, and Seiki Yano, Kashihara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 5, 1983, Ser. No. 482,246**

**Claims priority, application Japan, Jul. 20, 1982, 57-127302**

**Int. Cl.⁴ H01S *3/19***

**U.S. Cl. 372—44** **5 Claims**




1. In a semiconductor laser comprising:

a semiconductor laser element including:

a semiconductor substrate;

an active layer formed on said semiconductor substrate; and

a heat sink secured to one surface of said semiconductor laser element, wherein:

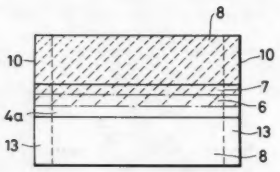
said active layer is formed in said semiconductor laser element at a position which is separated from said one surface by at least a distance which corresponds to about 32 to 35% of a thickness of said semiconductor laser element and is further separated from the surface opposite to said one surface by at least a distance which corresponds to about 16 to 18% of said thickness of the semiconductor laser element.

4,592,061

## TRANSVERSE JUNCTION STRIPE LASER WITH STEPS AT THE END FACES

Hisao Kumabe; Toshio Sogo, and Saburo Takamiya, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 25, 1982, Ser. No. 411,188
Claims priority, application Japan, Aug. 31, 1981, 56-137328
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—45 4 Claims




1. A semiconductor laser device, comprising:

a first semiconductor layer of a first conductivity type, a semiconductor active layer of said first conductivity type and a second semiconductor layer of said first conductivity type formed on a semi-insulating semiconductor substrate in the stated order in a first dimension, said first and second semiconductor layers having a larger forbidden band gap than said semiconductor active layer by 400–500 meV, a semiconductor region of a second conductivity type formed in predetermined regions of the first, active and second layers and extending into said semi-insulating substrate, said semiconductor region forming pn junctions with said first active and second layers, reflectors formed on opposed ends of said semiconductor laser device to form a resonator, and two electrodes connected respectively to said semiconductor region and a portion of said second semiconductor layer which is of said first conductivity type,

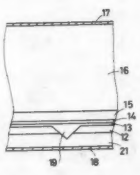
said active layer being substantially bent in said first dimension in a direction away from a main surface thereof at and along the entirety of both end portions of said resonator between said reflectors, and such that a middle portion of a wave-guide path between said reflectors comprises said active layer while both end portions thereof are formed of one of said first and second semiconductor layers.

4,592,062

## (VSIS) SEMICONDUCTOR LASER WITH REDUCED COMPRESSIVE STRESS

Saburo Yamamoto, Nara; Hiroshi Hayashi, Kyoto, and Seiki Yano, Kashihara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 25, 1983, Ser. No. 498,041
Claims priority, application Japan, May 25, 1982, 57-89249
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—48 4 Claims




1. In a V-channeled substrate inner stripe (VSIS) semiconductor laser, the improvement comprising:

a first epitaxially grown layer (21);

a second epitaxially grown layer (12) formed on said first epitaxially grown layer (21) with the intervention of a p-n junction formed between said first epitaxially grown layer (21) and said second epitaxially grown layer (12);

a V-shaped groove formed in said second epitaxially grown layer (12) to a depth sufficient to reach said first epitaxially grown layer (21) through said p-n junction;

a laser oscillation layer (13, 14, 15) formed on said second epitaxially grown layer (12), said laser oscillation layer (13, 14, 15) including an active layer (14) made of a compound of semiconductor material including at least three components;

a supporting layer (16) formed on said laser oscillation layer (13, 14, 15), said supporting layer (16) being made of a compound of semiconductor material including said at least three components, wherein each component of the support layer has a composition ratio with respect to the associated component of the active layer suited for minimizing compressive stress applied to said active layer (14);

a first electrode (17) formed on said supporting layer (16); and

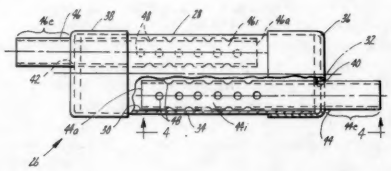
a second electrode (18) formed on the bottom surface of said first epitaxially grown layer (21).

4,592,063

## PULSED GAS LASERS HAVING FLEXIBLE EXIT GAS LINES

Joseph S. Accetta; Louis Galan, both of Ann Arbor; Patrick D. Hamilton, Northville, and James L. Amick, Ann Arbor, all of Mich., assignors to Photon Sources, Inc., Livonia, Mich.

Filed Aug. 27, 1984, Ser. No. 644,828
Int. Cl.[4] H01S 3/22
U.S. Cl. 372—58 13 Claims



1. In a gas laser having a cavity through which an active gas is passed and subjected to a pulsed frequency electric field for exciting the gas molecules and wherein exit gas is pumped from the cavity through an exit path which includes a flexible tube, the improvement for enhancing performance of the flexible tube comprises a device through which the exit gas passes before entering the flexible tube, said device comprising a walled chamber providing substantial attenuation of pressure waves in the exit gas at the pulse frequency before the exit gas reaches the flexible tube.

4,592,064

## INNER-SHELL D-ELECTRON PHOTOIONIZATION APPARATUS

William T. Silfvast, Holmdel, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 30, 1983, Ser. No. 537,634
Int. Cl.[4] H01S 3/09
U.S. Cl. 372—73 27 Claims

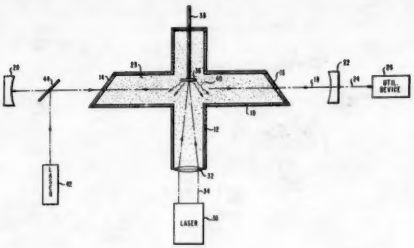
1. Stimulated emission apparatus comprising

means for providing atoms or ions in a target energy state which is absorptive of X-rays,

the energy levels of said atoms or ions including upper and lower optically coupled laser levels, said upper level being nonmetastable, and

means for generating population inversion between said

upper and lower laser levels including means for generating X-rays having a wavelength effective to remove preferentially inner-shell d-electrons from said atoms or ions in said target state.

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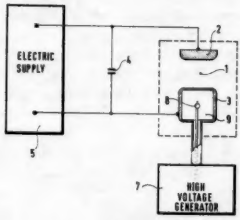
**4,592,065**

## GAS LASER EXCITED BY A TRANSVERSE ELECTRICAL DISCHARGE TRIGGERED BY PHOTOIONIZATION

**Olivier de Witte, Gif sur Yvette, France, assignor to Compagnie Industrielle des Lasers Cilas Alcatel, Marcoussis, France**

**Filed Jun. 27, 1983, Ser. No. 507,634**
**Claims priority, application France, Jun. 25, 1982, 82 11172**
**Int. Cl.[4] H01S *3/097***
**U.S. Cl. 372—83** **5 Claims**




1. In a gas laser excited by a transverse electric discharge itself triggered by photoionization, said laser comprising:

two spaced linear laser electrodes, namely a laser cathode and a laser anode, extending parallel in a longitudinal direction and facing each other, means for maintaining the space between said electrodes occupied by an active gaseous medium suitable for amplifying laser radiation when excited by said electric discharge;

a laser capacitor having very low impedance enabling rapid discharge into said active medium to excite said medium, and having its two terminals directly connected to the two laser electrodes;

a high energy laser charging circuit for charging said laser capacitor to an operating voltage which is less than the self-discharge voltage which would on its own cause arcs to strike across between said laser electrodes, said charge creating an operating electric field in said active medium;

a generator of ionizing radiation for directing a pulse of trigger radiation into the active medium, after the active medium has been subjected to the operating field, said pulse being sufficiently large to trigger a uniform transverse discharge between the laser electrodes to make the medium a laser radiation amplifying medium;

said generator of radiation comprising a high-speed, short rise time voltage generator supplying said trigger pulse in less than 10 nanoseconds, and

wherein said high energy laser charging circuit comprises means for supplying the voltage of the laser capacitor to said laser electrodes before the ionizing radiation generator directs the pulse of trigger radiation into said active medium,

whereby, a homogeneous laser discharge is obtained between the electrodes with increased energy efficiency, increased operating rate, and extended lifetime for said gas laser.

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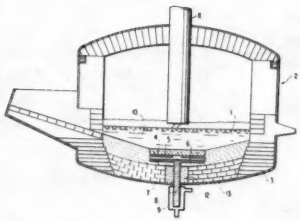
**4,592,066**

## CONDUCTIVE BOTTOM FOR DIRECT CURRENT ELECTRIC ARC FURNACES

**Eugenio Repetto; Fabrizio Marafini, both of Rome, and Francesco Tesini, Genoa, all of Italy, assignors to Italimpianti-Societa Italiana Impianti P.A., Genoa, Italy**

**Filed Jan. 4, 1985, Ser. No. 688,764**
**Claims priority, application Italy, Feb. 2, 1984, 47641 A/84**
**Int. Cl.[4] H05B *7/00***
**U.S. Cl. 373—72** **9 Claims**



1. A conductive bottom for direct current electric arc furnaces having a hearth with a refractory bottom, the hearth comprising:

at least one removable electrically-conductive prefabricated element in contact with the metal bath and resting on

an intermediate part of electrically conductive granular material, resting on

a terminal metal part, electrically insulated from the shell of the furnace, comprising a conductive metal plate with a metal rod on the face farthest from the bath, which rod passes through said refractory bottom and protrudes partially therefrom.

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**4,592,067**

## METALLURGICAL VESSEL, IN PARTICULAR AN ELECTRIC ARC FURNACE

**Gerhard Fuchs, Kehl-Bodersweier; Joachim Ehle, Lautenbach, and Hans-Peter Heinzelmann, Rheinau-Diersheim, all of Fed. Rep. of Germany, assignors to Fuchs Systemtechnik GmbH, Willstatt-Legelshurst, Fed. Rep. of Germany**

**Filed Aug. 21, 1984, Ser. No. 642,791**
**Claims priority, application Fed. Rep. of Germany, Feb. 21, 1984, 3406130**
**Int. Cl.[4] F27D *3/14***
**U.S. Cl. 373—83** **13 Claims**

1. A metallurgical vessel comprising,

a main body provided with a tapping hole in the bottom thereof,

a closure plate movable between closed and open positions outside of said tapping hole,

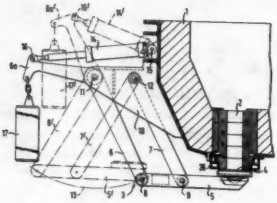
a substantially horizontal actuating area connected to said closure plate for effecting lateral movement of said plate,

a first lever pivotally supported at a first axis member mounted on the outside of said vessel main body and rotatably connected at a second axis member to said actuating arm,

drive means connected to said first lever for pivoting the same about said first axis member and through rotation of

said first lever about said second axis member to cause said actuating arm to move laterally,

a second lever pivotally supported at a third axis member mounted on the outside of said vessel main body and



rotatably connected at a fourth axis member to said actuating arm, said second lever being spaced from said first lever to guide said actuating arm,

said first and second levers forming part of a parallelgram with each of said four axes at a respective corner thereof.

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**4,592,068**

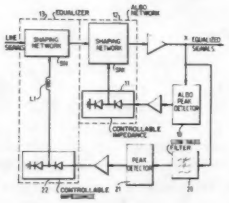
**REPEATER FOR A DIGITAL TRANSMISSION SYSTEM**

**Anthony Jessop, Harlow; Richard J. Catchpole, Bishop's Stortford; Peter J. Dyke, Stansted, and Brian S. Farley, Bishop's Stortford, all of England, assignors to International Standard Electric Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 219,556, Dec. 23, 1980, abandoned. This application Mar. 28, 1983, Ser. No. 479,765**

**Int. Cl.[4] H04B** *3/36*

**U.S. Cl. 375—3** **3 Claims**



1. A repeater for a digital transmission line system comprising:

an automatic line build out circuit having a primary equalization of feedback control loop coupled between an output of said line build out circuit and a first controllable impedance means connected in said line build out circuit; and

an equalizer circuit having its output coupled to an input of said line build out circuit, said equalizer circuit having at least one secondary feedback control loop coupled to said output of said line build out circuit, said secondary loop including a filter coupled to said output of said line build out circuit and a first peak detector coupled to the output of said filter for sensing the peak amplitude of the equalized signal low frequency voltage developed at said filter output to produce a control signal to control a variable resistance means connected in said equalizer circuit.

**4,592,069**

**LINE POWERED MODEM**

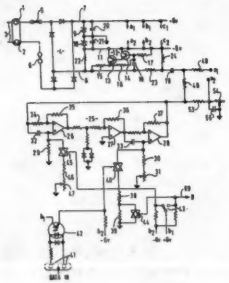
**Robert J. Redding, September House, Cox Green La., Maidenhead, Berkshire, SL6 3EL, United Kingdom**

**Filed Feb. 8, 1984, Ser. No. 578,062**

**Claims priority, application United Kingdom, Feb. 10, 1983, 8303631; Oct. 10, 1983, 8326997**

**Int. Cl.[4] H04M** *19/00*

**U.S. Cl. 375—8** **14 Claims**



1. An inductance simulation circuit to be connected to a transmission line providing a line-holding direct current and carrying alternating data signals, the circuit being operative to exhibit a relatively low resistance to direct current flow between two points in the circuit whereby a d.c. power supply for energising data handling apparatus can be derived from said direct current flow and to exhibit a relatively high impedance for alternating signals occuring between those points, the circuit comprising resistance means connected between the points, and an amplifier circuit connected across the resistance means to provide a low resistance d.c. path in parallel with the resistance means and operative to amplify the alternating signals and to apply the amplified alternating signals across the resistance means in a phase such that the amplifier circuit simulates an inductance connected across the points.

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**4,592,070**

**ADPCM ENCODER/DECODER WITH IMPROVED TRACKING**

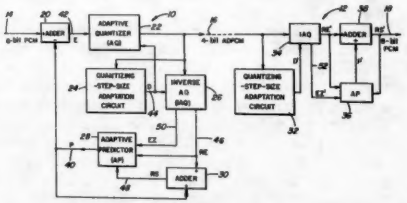
**Peter E. Chow, Nepean; Andreas H. Weirich, and Leo Strawczynski, both of Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada**

**Filed Nov. 28, 1983, Ser. No. 555,357**

**Claims priority, application Canada, Nov. 25, 1983, 442021**

**Int. Cl.[4] H03M** *3/04;* **H04B** *14/06*

**U.S. Cl. 375—27** **10 Claims**



7. A method of decoding an ADPCM signal produced by quantizing an error signal, comprising the steps of:

producing a reconstructed error signal from the ADPCM signal;

producing a reconstructed signal from the reconstructed error signal and a predicted signal;

producing the predicted signal by adaptive prediction from the reconstructed signal and the reconstructed error signal in dependence upon predictor coefficients which are adapted in dependence upon a leakage function and in dependence upon the reconstructed signal and the reconstructed error signal; and

inhibiting the adaptation of the predictor coefficients in dependence upon the reconstructed signal and the reconstructed error signal for small magnitudes of the ADPCM signal.

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**4,592,071**

## RECOVERY OF CARRIER AND CLOCK FREQUENCIES IN A PHASE OR AMPLITUDE STATE MODULATION AND COHERENT DEMODULATION DIGITAL TRANSMISSION SYSTEM

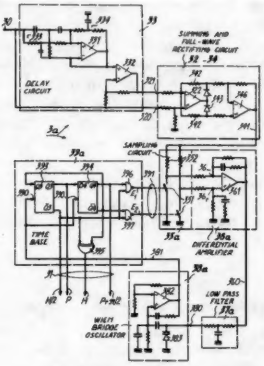
**Jean-Pierre Prigent, rue de Verdun, 22300 Lannion, France**

**Filed Apr. 4, 1984, Ser. No. 597,065**

**Claims priority, application France, Apr. 12, 1983, 83 05942**

**Int. Cl.[4] H03C *5/00***

**U.S. Cl. 375—42** **9 Claims**




1. An arrangement for recovering carrier and clock frequencies in a digital transmission system comprising:

in a transmitting part,

means for multiplying a frequency 1/T of a clock signal provided with a binary signal by a predetermined ratio n into a carrier wave frequency P, and

means receiving said binary signal, clock signal and carrier wave for modulating in phase of amplitude said carrier wave by said binary signal into a modulation signal having $I=2^J$ possible phase or amplitude states corresponding to combinations of J consecutive bits in said modulating binary signal, said modulation signal having a modulation frequency $1/\tau$ equal to 1/JT, and

in a receiving part,

means for delaying said modulation signal by a time equal to half the modulation period $\tau$ to provide a delayed modulation signal,

means for summing said modulation signal and said delayed modulation signal into a summation signal,

means for full-wave rectifying said summation signal into a rectified signal,

phase locked means receiving said rectified signal for recovering said carrier wave frequency and clock signal frequency, and

means receiving said recovered carrier wave and clock signal for phase or amplitude demodulating said modulation signal into said binary signal.

**4,592,072**

## DECODER FOR SELF-CLOCKING SERIAL DATA COMMUNICATIONS

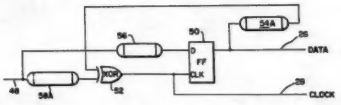
**Robert E. Stewart, One No Name Rd., Stow, Mass. 01775**

**Continuation of Ser. No. 376,069, May 7, 1982, Pat. No. 4,450,572. This application Feb. 10, 1984, Ser. No. 578,883**

**The portion of the term of this patent subsequent to May 22, 2001, has been disclaimed.**

**Int. Cl.[4] H03K *13/24***

**U.S. Cl. 375—55** **1 Claim**




1. Apparatus for decoding to an NRZ signal an encoded signal received from a signal source, the encoded signal encoding a series of data bits with, for each data bit, a first transition in the encoded signal, and for each data bit for which the succeeding data bit has the same binary value, a second transition occurring within a predetermined time interval after the first transition, said apparatus comprising:

A. storage means responsive to a clocking signal of at least a predetermined minimum pulse width, received at a clock input of the storage means, for storing a sample of a digital signal received at a data input of the storage means, the storage means having at least one output indicative of the value of the stored sample, an output of the storage mjeans providing the decoded NRZ signal,

B. an exclusive-OR gate,

C. a first signal path from an output of the storage means through the exclusive-OR gate to the clock input of the storage means,

D. a second signal path from the source of the encoded signal through the exclusive-OR gate to the clock input of the storage means, and

E. a third signal path from the source of the encoded signal to the data input of the storage means,

wherein

a. the time for a signal to propagate along the first signal path is at least as long as the minimum pulse width required to clock the storage means, and

b. wherein the difference between the time for a signal to propagate along the second signal path and the time for a signal to propagate along the third signal path is at least as long as said predetermined time interval, and

c. the output signal from the exclusive-OR gate comprises a signal which has exactly one pulse for each data bit.

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**4,592,073**

## BURST SIGNAL TRANSMISSION SYSTEM

**Kyoji Watanabe, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Nov. 29, 1983, Ser. No. 555,926**

**Claims priority, application Japan, Nov. 29, 1982, 57-209019**

**Int. Cl.[4] H04L *25/49***

**U.S. Cl. 375—60** **7 Claims**

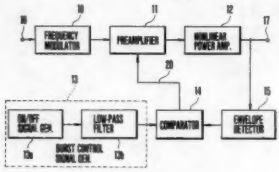
1. A signal control circuit for a burst signal transmission system comprising:

a main channel including a preamplifier for receiving a modulated carrier signal having a fixed envelope and a

nonlinear amplifier for amplifying an output from the preamplifier;

an envelope detector for detecting an envelope of an output signal from said nonlinear amplifier;

a burst control signal generator for generating a burst control signal for the modulated carrier signal having smoothed leading and trailing edges; and




control means, responsive to output signals of said envelope detector and burst control signal generator, for controlling the main channel so that a waveform of the output signal from said nonlinear amplifier is made analogous to that of the burst control signal from said burst control signal generator.

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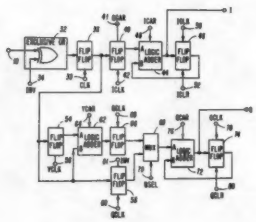
**4,592,074**

## SIMPLIFIED HARDWARE IMPLEMENTATION OF A DIGITAL IF TRANSLATOR

**J. William Whikehart, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Jun. 1, 1984, Ser. No. 616,361**
**Int. Cl.[4] H03D** *9/00*
**U.S. Cl. 375—75** **5 Claims**



1. A digital translator comprising:

means for sampling a digital input signal sequence representing a digital intermediate frequency at a sampling rate;

means for selecting samples of said input sequence to form a first channel sample sequence and a second channel sample sequence;

first means for summing a predetermined number of samples of said first channel sample sequence to provide an in-phase channel output of said digital input signal;

second means for summing the first and last samples of a predetermined number of said second channel sample sequence to provide a sum output; and

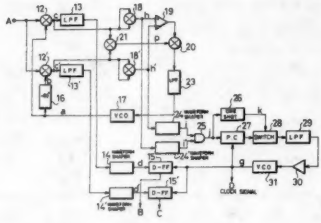
third means for summing a predetermined number of samples of said second sample sequence with said sum output to provide a quadrature phase channel output of said digital input signal.

**4,592,075**

## PHASE-SHIFT KEYING DEMODULATOR

**Akihito Tsukamoto, Soma, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed Jan. 24, 1985, Ser. No. 694,202**
**Claims priority, application Japan, Jan. 25, 1984, 59-11389**
**Int. Cl.[4] H04L** *27/22;* **H03D** *3/06, 3/18*
**U.S. Cl. 375—81** **3 Claims**




1. A PSK demodulator having two phase detectors for detecting the phase of a PSK signal and a carrier generator for supplying carriers of different phases to the two phase detectors, respectively, said PSK demodulator comprising squaring means for squaring output signals from said two phase detectors, difference computing means for computing the difference between output signals from the squaring means, product computing means for computing the product of the output signals from said two phase detectors, and product detecting means for detecting the product of an output signal from said product computing means and an output signal from said difference computing means, the arrangement being such that the frequencies and phases of the carriers generated by said carrier generator are controlled by an output signal from said product detecting means.

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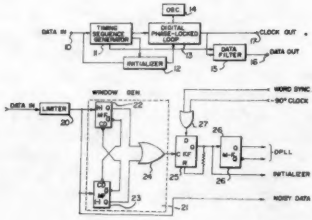
**4,592,076**

## SYNCHRONIZING SIGNAL RECOVERY CIRCUIT FOR RADIOTELEPHONES

**Mahmoud A. S. El-Banna, Mississauga, Canada, assignor to Novatel Communications Ltd., Calgary, Canada**

**Filed Jul. 29, 1983, Ser. No. 518,481**
**Int. Cl.[4] H04L** *7/00*
**U.S. Cl. 375—108** **10 Claims**




1. An improved synchronizing signal recovery circuit in a receiver for data signals having a predetermined word rate, a predetermined bit rate, and a predetermined synchronizing character rate, comprising:

generating means for acquiring a stable clock from said data signals at said bit rate;

initializing means responsive to said data signals for initializing said generating means;

first inhibiting means for inhibiting said initializing means from reinitializing said generating means for a predetermined duration upon being triggered by one of rising and falling pulse-edges in said data signals;

indicating means for indicating recognition of a synchronizing character; and

second inhibiting means responsive to said first inhibiting means and to said indicating means for inhibiting said generating means from recommencing acquisition of said stable clock.

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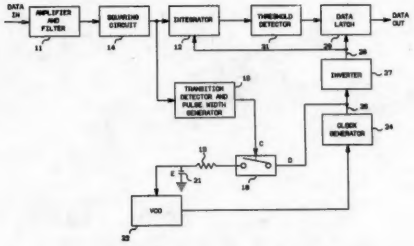
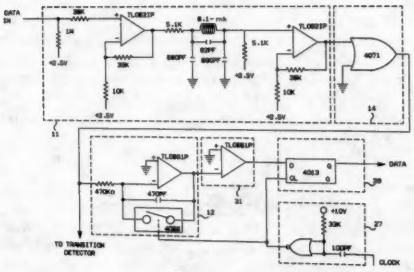
## 4,592,077
## NRZ DIGITAL DATA RECOVERY

**Jerry J. Norton, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Dec. 23, 1983, Ser. No. 565,252**
**Int. Cl.[4] H04L *7/02*; H03D *3/24***
**U.S. Cl. 375—110** **8 Claims**




1. Apparatus for generating a clock signal which has a period equal to the bit period of received non-return to zero (NRZ) digitial data and which is synchronized with said received NRZ digital data comprising:

a transition detector and pulse width generator;

means for providing said received NRZ digital data to said transition detector and pulse width generator, wherein said transition detector and pulse width generator provides an output pulse having a desired predetermined width each time said received NRZ digital data makes a state transition;

a switch having first and second terminals;

means for connecting a clock signal to a first terminal of said switch;

a capacitor;

means for electrically connecting said capacitor between the second terminal of said switch and ground so that said capacitor is charged through said switch;

a voltage controlled oscillator;

means for electrically connecting said voltage controlled oscillator to

said capacitor wherein the voltage on said capacitor is equal to the voltage supplied to the input of said voltage controlled oscillator;

a clock generator;

means for providing the output signal from said voltage controlled oscillator to the clock input of said clock generator, wherein said clock generator generates said clock signal; and

means for providing said output pulse as a control signal to said switch, wherein said switch is closed periodically in response to said pulse, wherein the closing of said switch causes a change in the voltage on said capacitor if said output pulse is not synchronized with said clock signal and wherein the change in the voltage on said capacitor causes a change in the frequency of the output signal from said voltage controlled oscillator so as to adjust the period of said clock signal in such a manner that said clock signal is synchronized with said output pulse.

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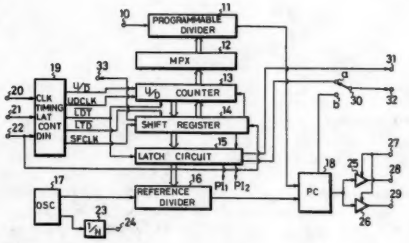
## 4,592,078
## UP/DOWN COUNTER CONTROL CIRCUIT

**Takaaki Yamada, Zama, Japan, assignor to Sony Corporation, Tokyo, Japan**

**PCT No. PCT/JP83/00093, § 371 Date Nov. 29, 1983, § 102(e) Date Nov. 29, 1983, PCT Pub. No. WO83/03502, PCT Pub. Date Oct. 13, 1983**
**PCT Filed Mar. 28, 1983, Ser. No. 557,179**
**Claims priority, application Japan, Apr. 1, 1982, 57-54465**
**Int. Cl.[4] G06M *3/00***
**U.S. Cl. 377—52** **8 Claims**



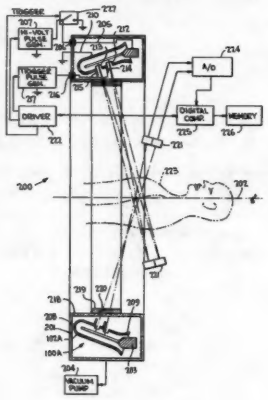

1. An up/down counter control circuit for use with a phase-locked loop circuit comprising: a reference signal oscillator means providing a reference oscillating signal; a voltage controlled oscillator means having an output providing an output oscillating signal whose frequency depends on an error signal applied thereto; a programmable divider means connected to the output of said voltage controlled oscillator means for providing a divided signal, and having a programmable dividing ratio and having a control terminal for receiving a programming control signal for programming the dividing ratio thereof; a phase comparator means supplied with said reference oscillating signal and said divided signal and having an output producing said error signal in response to the phase difference therebetween; a data register means for providing said programming control signal from an output thereof; an up/down counter means coupled between the output of said data register means and the control terminal of said programmable divider means to receive the programming control signal therein so as to control the dividing ratio of said programmable divider means; a signal input means for receiving a latch signal, a data signal and a clock signal; and a timing control means connected to said signal input means, wherein under control of said timing control means, in a data latch mode, a first level (0 or 1) of said latch signal is detected and said data signal is latched in synchronism with said clock signal in said data register means, while in an up/down mode, a second level (1 or 0) of said latch signal is detected and the content of said up/down counter is changed in response to the level of said data signal in synchronism with said clock signal.

4,592,079

## MEDICAL IMAGING DEVICE USING TRIGGERED PLASMA CATHODE FLASH X-RAY SOURCES

A. Robert Sohval, Cambridge, Mass.; Gerald Cooperstein, Rockville; Shyke A. Goldstein, Gaithersburg, both of Md., and David R. Hearn, Wellesley, Mass., assignors to Elscint Ltd., Haifa, Israel

Filed Oct. 21, 1981, Ser. No. 313,268
Int. Cl.[4] A61B *6/02;* H05G *1/70*
U.S. Cl. 378—9 24 Claims



1. A medical imaging device comprising:

(a) a plurality of triggered plasma cathode X-ray sources each having an anode and a cathode;

(b) an electrical network including a high voltage source for applying a predetermined voltage between all of the anodes as a group and all of the cathodes as a group;

(c) the electrical network also including a separate trigger system associated with each source and constructed and arranged so that, in response to the application of a trigger pulse to the trigger system of a selected source, a burst of plasma is created adjacent the cathode of the selected source, the predetermined voltage between the anode and cathode of the selected source causing electrons in the plasma to be accelerated toward and impact on the anode of the selected source at a focal spot thereby producing a burst of X-rays; and

(d) a plurality of detectors for receiving X-rays produced by the sources and producing output signals inresponse thereto.

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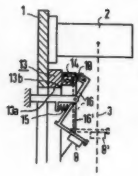
4,592,080

## COMPUTER TOMOGRAPH

Werner Rauch, Nuernberg; Guenter Schmitt, Erlangen, and Edgar Tschunt, Rathsberg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed May 23, 1984, Ser. No. 613,386
Claims priority, application Fed. Rep. of Germany, Jul. 29, 1983, 3327707
Int. Cl.[4] G01N *23/00*
U.S. Cl. 378—19 1 Claim

1. A computer tomograph comprising a measuring unit including an X-ray source and a radiation receiver, the X-ray source emitting a fan-shaped X-ray beam, the radiation receiver being of annular configuration and being formed of an array of individual detectors, each for supplying an electric signal corresponding to received radiation intensity, means for effecting the rotation of the X-ray beam about a radiography subject for the purpose of irradiation from various directions of a layer of the radiography subject, disposed in the plane of the fan-shaped X-ray beam, measured value processing circuitry for receiving the output signals of the individual detectors, which are obtained in the case of the various irradiation directions, and for determining attentuation values for predetermined points in the irradiated layer of the radiography subject, and an image display device for presenting an image display of the calculated attenuation values, each individual detector being mounted adjustably in such a fashion that it can be brought from a position outside the X-ray beam into a position in which it is impinged upon by the X-ray beam, characterized in that the individual detectors are combined into detector groups having an equal number of individual detectors, and that the detector groups are adjustable independently of one



another, means for sequentially displacing detector groups adjacent said X-ray source out of said X-ray beam in synchronism with beam rotation characterized in that, for the adjustment of the detector groups a cam plate is present which is rotatable synchronously with the rotation of the X-ray beam, a plurality of pivoted levers with a lever connected to each detector group and engageable with the cam plate for controlling the adjustment of the respective detector groups during rotation of the X-ray beam to sequentially move them out of said X-ray beam in synchronism with rotation of said source and a plurality of springs attached to said plurality of levers to bias said levers to a position to move said detector groups into said X-ray beam.

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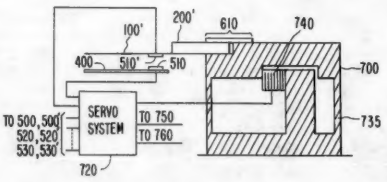
4,592,081

## ADAPTIVE X-RAY LITHOGRAPHY MASK

Steven G. Eaton, Palo Alto, and Graham J. Siddall, Woodside, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Feb. 10, 1984, Ser. No. 578,912
Int. Cl.[4] G21K *5/08*
U.S. Cl. 378—34 10 Claims




1. A mask aligner for use with a mask and a wafer comprising:

clamping means having at least three clamping members for clamping said mask into an X-ray stage and positioning said mask at an initial position;

electromechanical means connected to said clamping means for moving said clamping members laterally in the plane of said mask relative to one another and distorting said mask relative to said wafer;

sensor means for sensing the distortion of the mask relative

to the wafer and for producing a corresponding distortion signal; and

feedback means for accepting said corresponding distortion signal and for providing a signal to said electromechanical means so as to reduce in-plane distortion of said mask relative to said wafer.

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**4,592,082**

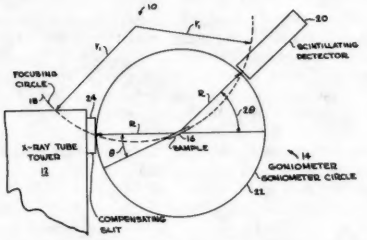
## QUANTITATIVE DETERMINATION OF MINERAL COMPOSITION BY POWDER X-RAY DIFFRACTION

**Gayle A. Pawloski, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Aug. 10, 1984, Ser. No. 639,287**

**Int. Cl.[4] G06F *15/46*; G06G *7/58*; G01N *23/27*; G01T *1/36***

**U.S. Cl. 378—075** **10 Claims**




1. A method of quantitatively determining the mineral composition in a test sample containing a number (m) of minerals from a group (n) of known minerals, wherein n=13, where m≦n, by x-ray diffraction, comprising:

determining from standard samples of the known minerals a set of (n) standard coefficients $K_j=(X_j/X_l)(I_l/I_j)$ for each mineral (j=2 . . . n) in the group of known minerals (j=2 . . . n) relative to one mineral (l) in the group selected as a reference mineral, where X is the weight fraction of the mineral in a standard sample, and I is the x-ray integrated intensity peak of each mineral obtained from the standard sample;

obtaining an x-ray diffraction pattern of the test sample;

indentifying each of the (m) minerals in the test sample for the x-ray diffraction pattern;

calculating the relative weight fractions $X_j/X_l$ for each mineral (j=2 . . . m) compared to the reference mineral (l) from the ratio of the measured highest integrated intensity peak $I_j$ of each mineral in the test sample to the measured highest integrated intensity peak $I_l$ of the reference mineral in the test sample, and from the previously determined standard coefficients, $X_j/X_l=K_j(I_j/I_l)$; and

calculating the weight fraction of the reference mineral $X_l$, and the weight fractions $X_j$ of each mineral (j=2 . . . m) from the condition that the sum of the weight fractions is 1, $\Sigma X_l=1$ (i=1 . . . m).

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**4,592,083**

## HIGH SPEED X-RAY SHUTTER

**Thomas P. O'Brien, Deerfield, Ill., assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan**

**Filed Mar. 27, 1984, Ser. No. 594,035**

**Int. Cl.[4] G21K *1/04***

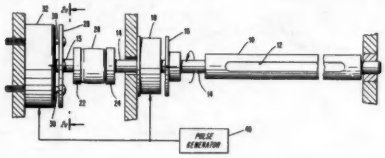
**U.S. Cl. 378—160** **11 Claims**

1. A shutter actuator in an X-ray scanner wherein a source of radiation rotates around an object while projecting radiation thereto, the radiation passing through the object being received by a detector, the actuator comprising:

drive means for rotating a shutter member to move a shutter aperture to an open position;

stop means for blocking movement of said member when said shutter aperture reaches said open position;

magnetic braking means, including armature and coil means, interconnected with said drive means such that braking engagement between said armature and coil is effected as




said shutter member and aperture move to said open position; and

resilient coupling means having an elastic member interposed between said drive means and said magnetic braking means to damp oscillatory energy produced by the blocking action of said stop means.

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**4,592,084**

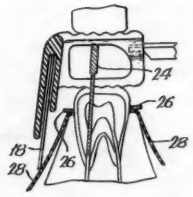
## DENTAL X-RAY HOLDER FOR USE IN ENDODONTICS

**David N. McAuslan, 1502 Avalon Ct., St. Charles, Ill. 60174**

**Filed Jan. 12, 1984, Ser. No. 570,084**

**Int. Cl.[4] G03B *42/02***

**U.S. Cl. 378—170** **6 Claims**




1. A dental X-ray film holder especially useful in endodontics comprising: a film retaining member having an inner tongue and an outer tongue defining a slot therebetween for receiving a X-ray film packet; and two spaced apart side walls integral with the respective side edges of said film retaining member, said side walls being adapted to be held between the patient's upper and lower teeth and together with said film retaining member defining a U-shaped area therebetween for accommodating endodontic equipment.

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**4,592,085**

## SPEECH-RECOGNITION METHOD AND APPARATUS FOR RECOGNIZING PHONEMES IN A VOICE SIGNAL

**Masao Watari; Makoto Akabane, both of Saitama; Hisao Nishioka, Chiba, and Toshihiko Waku, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Feb. 23, 1983, Ser. No. 469,114**

**Claims priority, application Japan, Feb. 25, 1982, 57-29471**

**Int. Cl.[4] G10L *1/00***

**U.S. Cl. 381—43** **28 Claims**

1. A method for recognizing particular phonemes in a voice signal having silence-phoneme and phoneme-phoneme transitions, said method comprising the steps of:

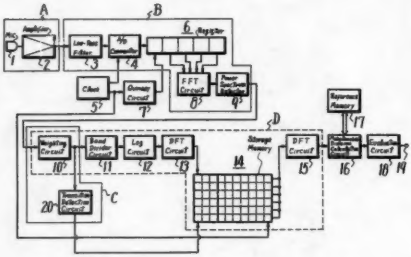
providing an electrical signal representing said voice signal;

producing a first acoustic parameter signal from said electrical signal, said first acoustic parameter signal containing phonemic information of said voice signal;

generating a transition signal from the phonemic information in said first acoustic parameter signal indicating the location in said voice signal of a transition;

storing said first acoustic parameter signal; and

producing a second acoustic parameter signal from said stored first acoustic parameter signal using said transition signal, said second acoustic parameter signal containing



phonemic information of said voice signal at said transition, whereby said second acoustic parameter signal can be compared with known phonemic information to recognize the phonemic information in said voice signal.

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**4,592,086**

## CONTINUOUS SPEECH RECOGNITION SYSTEM

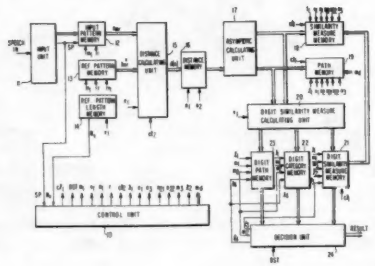
**Masao Watari, and Hiroaki Sakoe, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan**

**Filed Dec. 8, 1982, Ser. No. 447,829**

**Claims priority, application Japan, Dec. 9, 1981, 56-197841; Dec. 23, 1981, 56-208791**

**Int. Cl.[4] G10L *1/00***

**U.S. Cl. 381—43** **23 Claims**



1. A continuous speech recognition system for recognizing an input speech composed of a plurality of continuously spoken words comprising:

a speech analyzing means for analyzing an input signal at every given frame time point m and outputting an input pattern expressed in a time series of a feature vector consisting of a predetermined number of feature parameters;

an input pattern memory to store said input pattern;

a reference pattern memory to store a reference pattern consisting of said feature vector in the same format as said input pattern for each of plurality (V) of predetermined words to be recognized;

a distance calculating means to calculate the distance between the feature vector of said input pattern at a time point m and the feature vector of the reference pattern of the v-th words at a time point n under a predetermined distance formula by changing the time point n of the reference pattern of the v-th word in an arbitrary order from the start point to end point $N^v$ while changing the reference pattern v from the first word to end word V for each time point m of the input pattern, said each time point m changing from the start point to an end point M;

an asymptotic calculating means to calculate a similarity measure D(v, n) given by the cumulative sum of said distances at said time points n and path information F(v, n) indicating a time point of the input pattern at the start point of said v-th reference pattern on a path through which said similarity measure D(v, n) has been obtained by a predetermined asymptotic expression according to a dynamic programming process while changing the time point n of the reference pattern of the v-th word in an arbitrary order from the start point to end point $N^v$ and while changing the reference pattern v from the first word to end word for each time point m of the input pattern, said each time point m changing from the start point to end point M;

a digit similarity measure and digit path information calculating means to select a minimum similarity measure from among the similarity measures at the end time points of reference patterns of all the words obtained through said asymptotic calculating means, and to provide said minimum similarity measure as a digit similarity measure DB(m), a category to which the word corresponding to said minimum similarity measure belongs as a digit recognition category W(m)=v, and path information corresponding to said minimum similarity measure as a digit path information FB(m) at said time point m, for each time point m of the input pattern, said time point m changing from the start point to end point M;

an initializing means to give digit similarity measure DB(m−1) as an initial value of similarity measure and to give a time point (m−1) as an initial value of said path information at a time point m while changing the time point m of the input pattern from the start point to end point M;

a decision means to obtain a recognized result at a final digit from said digit recognition category W(M) at the end point M of said input pattern, to obtain an end point of said input pattern on the digit previous to the final digit by one from said digit path information at the end point M, to obtain a recognized result on the digit previous to said final digit by one from said digit recognition category at the end point, and to obtain a recognized result at each digit sequentially toward the start point of said input pattern.

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**4,592,087**

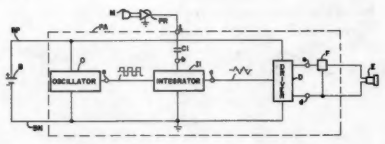
## CLASS D HEARING AID AMPLIFIER

**Mead C. Killion, Elk Grove Village, Ill., assignor to Industrial Research Products, Inc., Elk Grove Village, Ill.**

**Filed Dec. 8, 1983, Ser. No. 559,386**

**Int. Cl.[4] H04R *3/00***

**U.S. Cl. 381—68** **17 Claims**




1. In a hearing aid having a microphone, a power amplifier, and an output receiver transducer, said power amplifier being coupled to receive audio frequency input signals produced by said microphone and to drive said transducer in response to the input to said microphone, the improvement wherein: said power amplifier is of the pulse-width modulation type, and in response to the absence of an input signal from said microphone said power amplifier couples to said transducer an alternating electrical signal pulse train of positive and negative electrical pulses of substantially zero average value at an ultra-

sonic frequency, said amplifier including means for controlling the time duration of said positive and negative electrical pulses responsively to the amplitude of the audio frequency signal applied to the input of said power amplifier so as to provide to said transducer an audio frequency facsimile of said input signal.

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**4,592,088**

## SPEAKER APPARATUS

**Yasuomi Shimada, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

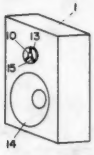
**PCT No. PCT/JP83/00345, § 371 Date Jun. 12, 1984, § 102(e) Date Jun. 12, 1984, PCT Pub. No. WO84/01682, PCT Pub. Date Apr. 26, 1984**

**PCT Filed Oct. 13, 1983, Ser. No. 621,917**

**Claims priority, application Japan, Oct. 14, 1982, 57-180705; Nov. 15, 1982, 57-201341; Nov. 15, 1982, 57-201353**

**Int. Cl.[4] H04R** *1/02, 3/04, 29/00*

**U.S. Cl. 381—90** **11 Claims**




1. A speaker apparatus comprising:

an input terminal for receiving an input signal;

a speaker for radiating a sound wave, said speaker having a sound wave radiation axis;

a power amplifier connected between said input terminal and said speaker for driving said speaker to produce a sound wave;

a feedback amplifier;

a microphone for detecting the sound wave from said speaker and connected to said power amplifier via said feedback amplifier for feeding back to said power amplifier a feedback signal which has a frequency range below an upper limit frequency, said microphone being disposed in a plane which is substantially perpendicular to the direction of said sound wave radiation axis, and wherein said plane substantially contains an acoustic center of said speaker and said microphone is located at a distance from said sound radiation axis which is not greater than ¼ of the wavelength corresponding to the upper limit frequency of the feedback signal.

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**4,592,089**

## ELECTROPHORETOGRAM ANALYTICAL IMAGE PROCESSING SYSTEM

**John R. Hartman, Ann Arbor, Mich., assignor to Bio Image Corporation, Ann Arbor, Mich.**

**Filed Aug. 15, 1983, Ser. No. 523,449**

**Int. Cl.[4] G06K** *9/00*

**U.S. Cl. 382—6** **15 Claims**

1. A method of analyzing electrophoresis samples having a plurality of spots therein, said method comprising:

displaying an image of at least a portion of said sample on a display;

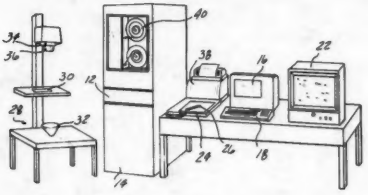
selecting a spot on the display desired to be analyzed;

scanning the sample to generate an electrophoretogram having a matrix of pixel values associated with characteristics of the gel;

choosing pixel locations within the matrix to define boundary edges for the spot as a function of pixel values located in a predetermined area around the spot;

analyzing the pixel values within the defined spot boundary and providing output data as a result of the analysis; and

superimposing over the originally selected spot on the display a visual indication of said chosen pixel locations




whose associated values were actually used in be analysis to arrive at said output data thereby providing the user with visual confirmation that the desired spot shape was analyzed.

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**4,592,090**

## APPARATUS FOR SCANNING A SHEET

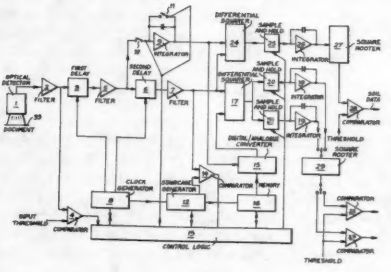
**Barry J. Curl, Durley, and Victor B. Chapman, Clanfield, both of England, assignors to De La Rue Systems Limited, London, England**

**Continuation of Ser. No. 406,836, Aug. 10, 1982, abandoned. This application Jun. 7, 1985, Ser. No. 742,135**

**Claims priority, application United Kingdom, Aug. 11, 1981, 8124501; Nov. 4, 1981, 8133280**

**Int. Cl.[4] G06K** *9/60*

**U.S. Cl. 382—7** **11 Claims**




1. Apparatus for scanning a sheet printed with a pattern comprising:

means defining a flow path for the sheet;

means for illuminating at least a part of the flow path;

means for moving the sheet along the flow path;

means for collecting light from an illuminated strip of a sheet passing along the flow path, the strip being substantially perpendicular to the direction of movement of the sheet and extending, in said perpendicular direction, beyond the lateral borders of the surface of the sheet as it travels along the flow path;

photoelectric means receiving the whole of the light collected from the illuminated strip and generating, at any instant, a single intensity signal representing the intensity of the whole of the collected light; and

analyzing means responsive to successive ones of generated intensity signals to create a waveform which is characteristic of the surface of the sheet.

## 4,592,091

## COMPOSITE HANDLE FOR PORTABLE CONTAINERS

Rino Italici, San Lazzaro di Savena, Italy, assignor to Lucas International s.r.l., Emilia, Italy

Filed Aug. 1, 1984, Ser. No. 636,762
Claims priority, application Italy, Aug. 9, 1983, 15235/83[U]
Int. Cl.[4] A45C *13/26;* B65D *33/06*
U.S. Cl. 383—15 4 Claims

1. A composite handle for a portable container, comprising

(a) a pair of handles (M, M') each fastened to a side of said container (C), and each handle consisting of at least two straps (1, 2) of flexible strong material, said two straps of each handle being fastened together at an intermediate section (101) to be gripped by a user; and

(b) adhesive strip means (7) for removably securing by mutual engagement an intermediate section (101) of one handle (M) to a corresponding intermediate section (101) of the other handle (M'), in superposed relation, so as to obtain, at said mutually engaged intermediate portions (101) of each handle (M, M'), a single composite gripping section having sufficient thickness and rigidity to allow easy gripping by said user;

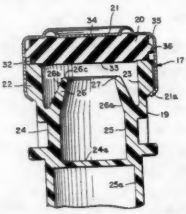
(c) one of said two straps composing each handle having a width which is approximately twice the width of the other of said straps, said double-width strap being folded over its longitudinal edges at said intermediate section so as to reduce its width, at said intermediate section, substantially to the width of said other strap.

## 4,592,092

## MEDICAL SOLUTION CONTAINER AND PORT CONSTRUCTION THEREFOR

Charles J. McPhee, Huntington Beach, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.

Continuation of Ser. No. 340,899, Jan. 20, 1982, Pat. No. 4,484,916. This application Jun. 25, 1984, Ser. No. 605,075
The portion of the term of this patent subsequent to Nov. 27, 2001, has been disclaimed.
Int. Cl.[4] A61M *5/00*
U.S. Cl. 383—80 10 Claims



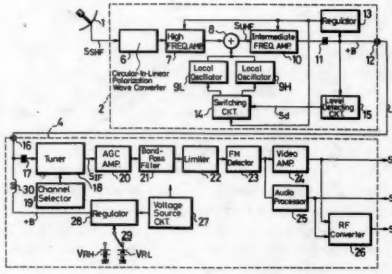
1. A medical solution container formed of flexible thermoplastic material having a tubular neck projecting away from said container and defining an outlet portion for receiving and retaining the spike of an administration set, said neck having a proximal end merging with said container and a distal end opposite from said proximal end and remote from said container, said distal end including a distal wall portion providing an enlarged cylindrical bore and said proximal end including a proximal wall portion providing a reduced coaxial cylindrical bore, a tapered annular collar disposed within said neck and formed integrally therewith, said collar extending distally from said proximal wall portion into said enlarged bore, said collar also having an inner surface merging proximally with the surface of said reduced cylindrical bore and having an outer surface that, when said collar is untensioned and undeformed, is spaced radially inwardly from the surface of said enlarged cylindrical bore, whereby, said collar is free to flex radially outwardly into the space between said collar and the surface of said enlarged cylindrical bore upon engagement by a spike inserted into said collar, said inner and outer surfaces of said tapered collar both sloping inwardly and distally with said outer surface having a greater acute angle of slope.

## 4,592,093

## SUPER HIGH FREQUENCY RECEIVER

Koji Ouchi; Shinobu Tsurumaru; Tadashi Kajiwara, all of Kanagawa, and Kenichiro Kumamoto, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 3, 1985, Ser. No. 688,544
Claims priority, application Japan, Jan. 13, 1984, 59-5391
Int. Cl.[4] H04N *7/16;* H04B *3/44, 1/26*
U.S. Cl. 455—4 7 Claims




1. Apparatus for receiving super high frequency signals, the apparatus comprising:

an outdoor unit having means for converting super high frequency signals to ultra high frequency signals, local oscillator means for generating a local signal which is supplied to said converting means, means for switching the frequency of said local signal, and means for detecting an operating voltage which is supplied to said outdoor unit and the value of which is changed according to a band range of said super high frequency signals, the output of said detecting means controlling said switching means;

an indoor unit having means for demodulating said ultra high frequency signals, and means for generating said operating voltage; and

cable means for supplying said ultra high frequency signals from said outdoor unit to said indoor unit and supplying said operating voltage from said indoor unit to said outdoor unit.

4,592,094

## RECEIVER COMPRISING A SEARCH TUNING CIRCUIT HAVING MEANS FOR FINDING THE TUNING DATA OF A SEARCH-TUNED TRANSMISSION AFTER MANUAL TUNING

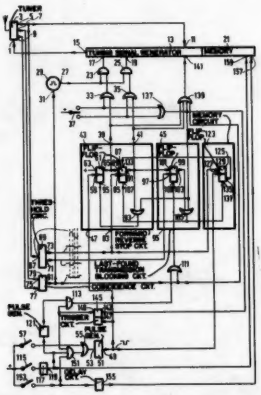
Pieter J. Ufkes, Veldhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 4, 1984, Ser. No. 647,246

Claims priority, application Netherlands, Sep. 16, 1983, 8303203

Int. Cl.[4] H03J 7/22; H04N 5/50

U.S. Cl. 455—164 8 Claims



1. A receiver comprising a search tuning circuit having a forward-reverse-stop circuit whose action causes the tuning of the receiver to proceed in a given forward direction after a search tuning action has started, to reverse in response to a signal received and to stop when tuning is substantially correct, having a last-found-transmission blocking circuit to prevent the same transmission from being tuned to at a restart of a search tuning action and having a manual control circuit by means of which a tuning found by a search tuning action can be changed, characterized in that the last-found transmission blocking circuit comprises a first trigger circuit an output of which is coupled to a reverse-reset input of the forward-reverse-stop circuit, the first trigger circuit being adapted to be set by a combination of a reverse output signal of the forward-reverse-stop circuit and a tuned-too-near signal and reset by a control element for rendering the last-found transmission blocking circuit inoperative and by a receiving condition signal.

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4,592,095

## MICROWAVE FET MIXER ARRANGED TO RECEIVE RF INPUT AT GATE ELECTRODE

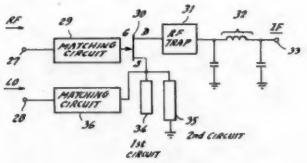
Hiroshi Ohnishi, Tokyo, and Sadahiko Yamashita, Sagamihara, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Mar. 26, 1984, Ser. No. 594,684

Claims priority, application Japan, Mar. 25, 1983, 58-50667

Int. Cl.[4] H04B 1/26

U.S. Cl. 455—327 10 Claims




1. A microwave mixer comprising:

(a) a field effect transistor having a gate for receiving a radio frequency input signal, a source for receiving a local oscillator signal, and a drain for outputting an intermediate frequency signal produced as the result of mixing of said radio frequency input signal and said local oscillator signal;

(b) a first circuit connected directly to said source for exhibiting a short-circuited impedance at a frequency band of said radio frequency input signal; and

(c) a second circuit connected to said source for exhibiting an open-circuited impedance at a frequency band of said local oscillator signal.

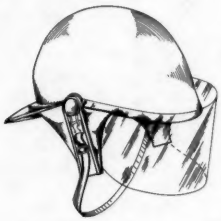
# DESIGN PATENTS

## GRANTED MAY 27, 1986

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| D27–036 | 284,031 |

283,940
FIREMAN'S HELMET
Alexander Bally, Carnegie, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.
Filed Jul. 22, 1983, Ser. No. 515,988
Term of patent 14 years
U.S. Cl. D2—232



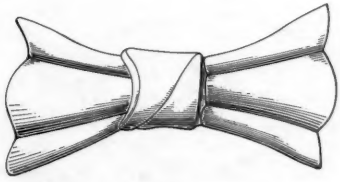
283,941
CROCHETED HAT
Martha N. Smith, 5212 N. Washington Blvd., Arlington, Va. 22205
Filed Jan. 20, 1984, Ser. No. 572,311
Term of patent 14 years
U.S. Cl. D2—257

283,942
BOOT
Peter Valori, London, England, assignor to Button Fronts, Ltd., London, England
Filed Jan. 18, 1984, Ser. No. 571,799
Claims priority, application United Kingdom, Sep. 8, 1983, 1014998
Term of patent 14 years
U.S. Cl. D2—273

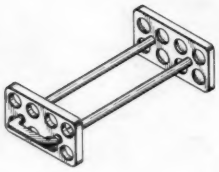
283,943
SWEATBAND WITH STORAGE COMPARTMENT
Peggy L. Rainey, 13401 Arcturus Ave., Gardena, Calif. 90249
Filed Aug. 15, 1983, Ser. No. 522,980
Term of patent 14 years
U.S. Cl. D2—400

283,944
BELT BUCKLE
Alexis V. Kirk, New York, N.Y., assignor to Somersett Moon, New York, N.Y.
Filed Nov. 27, 1984, Ser. No. 675,295
Term of patent 14 years
U.S. Cl. D2—420

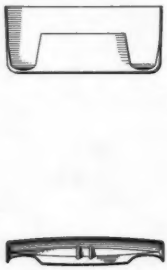
283,945
BELT BUCKLE
Alexis V. Kirk, New York, N.Y., assignor to Somersett Moon, New York, N.Y.
Filed Dec. 21, 1984, Ser. No. 684,696
Term of patent 14 years
U.S. Cl. D2—431



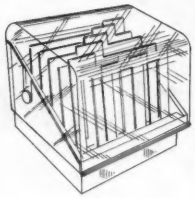
283,946
CARRYING CASE FOR TOY
Nelson L. Chase, R.R. #2, Road 600 South, Box 322, Lynn, Ind. 47355
Filed Oct. 24, 1983, Ser. No. 544,692
Term of patent 14 years
U.S. Cl. D3—30.1

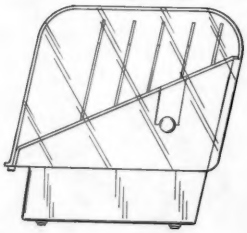


283,947
INSERT FOR AN EYEGLASS CASE
Ronald Scoppettone, 25 Redfearn Dr., Alamo, Calif. 94507
Filed Nov. 25, 1983, Ser. No. 554,885
Term of patent 14 years
U.S. Cl. D3—34

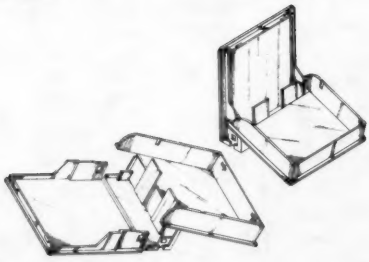


283,948
STORAGE AND FILING CONTAINER FOR MAGNETIC DISKS
Leon C. Clouser, Lombard; Gerald R. Klaus, St. Charles; Paul D. Nizzere, Darien; Robert A. O'Neil, West Chicago; Douglas S. Ramsdale, Palatine, and Thomas E. Williams, Glendale Heights, all of Ill., assignors to Fellowes Manufacturing Company, Itasca, Ill.
Filed Dec. 20, 1983, Ser. No. 563,575
Term of patent 14 years
U.S. Cl. D3—35

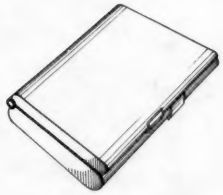


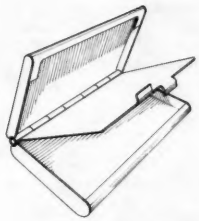


283,949
FLOPPY DISK STORAGE BOX
Katsuichi Kitada, 2-9, Naka-Magome, 1-chome, Ohta-ku, Tokyo, Japan
Filed Dec. 15, 1983, Ser. No. 561,700
Term of patent 14 years
U.S. Cl. D3—35



283,950
COMBINED CARD AND CALCULATOR CASE
Aaron Markowitz, Rochester, N.Y., assignor to Harwood Manufacturing Company, Providence, R.I.
Filed Nov. 7, 1983, Ser. No. 549,901
Term of patent 14 years
U.S. Cl. D3—58

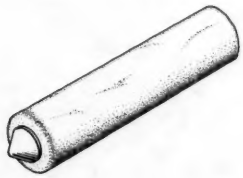




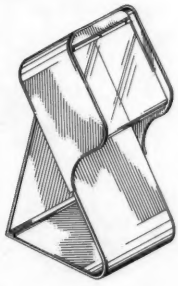
283,951
TOOTHBRUSH
Staffan Plantén, Parkstrasse 15, 7064 Remshalden-Buoch; Torbjoern Askeroth, Ebingerstrasse 43, and Eric Alton, Gustav-Blickle-Strasse 9, both of D-7472 Winterlingen, all of Fed. Rep. of Germany
Filed Sep. 20, 1984, Ser. No. 652,789
Claims priority, application Fed. Rep. of Germany, Jun. 7, 1984, 1946-84
Term of patent 14 years
U.S. Cl. D4—105

283,952
COMBINED TOOTHBRUSH AND TONGUE CLEANER
Harry D. Berkowitz, 500 S. Federal Hwy., Hollywood, Fla. 33020
Filed Jul. 27, 1984, Ser. No. 635,343
Term of patent 14 years
U.S. Cl. D4—108

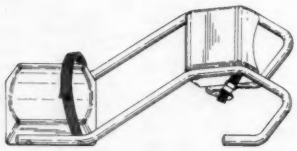
283,953
ROLLER FOR A BLIND CLEANER
Jeff A. Jacobson, 22 Woodgrove, Irvine, Calif. 92714
Filed Jan. 19, 1984, Ser. No. 572,118
Term of patent 14 years
U.S. Cl. D4—122



283,954
DISPLAY STAND
Bryan E. Daws, Phoenix, Ariz., assignor to Phoenix Newspapers, Inc., Phoenix, Ariz.
Filed Jan. 30, 1984, Ser. No. 575,197
Term of patent 14 years
U.S. Cl. D6—310

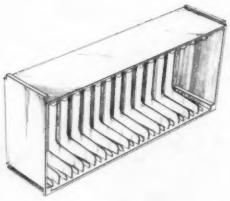


283,955
COMBINED LEG AND KNEE REST OR SIMILAR ARTICLE
Hans C. Mengshoel, Bygdøy Allé 12, Oslo 2, and Peter Opsvik, Högtunveien 12, 1370 Asker, both of Norway
Filed Aug. 25, 1983, Ser. No. 526,354
Claims priority, application Norway, Feb. 28, 1983, 63781
Term of patent 14 years
U.S. Cl. D6—330



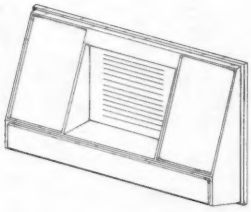
283,956
HIGH CHAIR
Gary R. Lemmeyer, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Feb. 2, 1984, Ser. No. 576,264
Term of patent 14 years
U.S. Cl. D6—339

283,957
CASSETTE STORAGE RACK
David M. Stravitz, 16 Park Ave., New York, N.Y. 10016
Filed Mar. 26, 1984, Ser. No. 593,637
Term of patent 14 years
U.S. Cl. D6—407

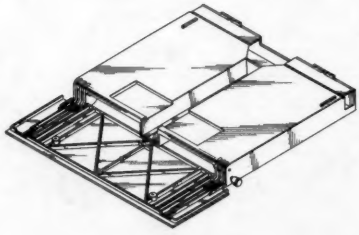


283,958
COMPUTER DESK
J. B. Payne, Jr., 4721 Briarwood Dr., Chattanooga, Tenn. 37416
Filed Mar. 5, 1984, Ser. No. 586,316
Term of patent 14 years
U.S. Cl. D6—426

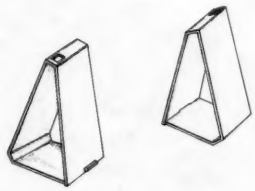
283,959
FACE PANEL FOR A TAPE STORAGE DRAWER
Jam Sun, Taipei, Taiwan, assignor to Jam Sun Office Products, Inc., Burlingame, Calif.
Filed Jun. 3, 1983, Ser. No. 500,986
Claims priority, application Australia, Feb. 8, 1983, 2813-83
Term of patent 14 years
U.S. Cl. D6—492



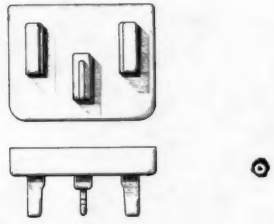
283,960
DISPLAY PLATFORM WITH FOLDING KEYBOARD STORAGE SHELF
Vincent Giannotti, Jr., Austin, and James B. Smith, Georgetown, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Jun. 27, 1983, Ser. No. 508,358
Term of patent 14 years
U.S. Cl. D6—511



283,961
TOOTHBRUSH HOLDER
James P. Doyle, Long Sault, Canada, assignor to Johnson & Johnson Products, Inc., New Brunswick, N.J.
Filed Oct. 28, 1983, Ser. No. 546,421
Term of patent 14 years
U.S. Cl. D6—534

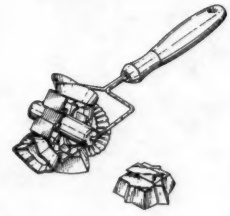


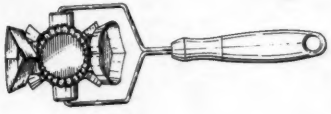
283,962
RACK FOR CAN OPENER
Leonhard Hagedorn, Niederneisen, and Rolf-Günter Schülein, Singhofen, both of Fed. Rep. of Germany, assignors to Leifheit AG, Nassau/Lahn, Fed. Rep. of Germany
Division of Ser. No. 251,566, Apr. 6, 1981, Pat. No. Des. 276,018. This application Oct. 23, 1984, Ser. No. 664,115
Claims priority, application Fed. Rep. of Germany, Oct. 31, 1980, 6MR 1061
Term of patent 14 years
U.S. Cl. D6—553



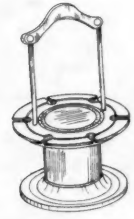
283,963
PILLOW
Frieda H. Rowland, 7024 Via Nueva, Scottsdale, Ariz. 85258
Filed Oct. 25, 1985, Ser. No. 793,349
Term of patent 14 years
U.S. Cl. D6—599

283,964
PASTRY CUTTER WITH REMOVABLE CUTTING MOLDS
So Shun, 2nd floor, Block B, Chuan Yuan Factory Bldg., 342-344 Kwun Tong Rd., Kwun Tong, Kowloon, Hong Kong
Filed Nov. 8, 1982, Ser. No. 440,013
Claims priority, application United Kingdom, Jul. 1, 1982, 1 007 509
Term of patent 14 years
U.S. Cl. D7—43

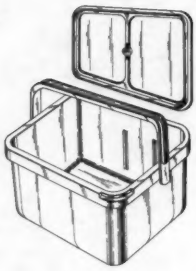




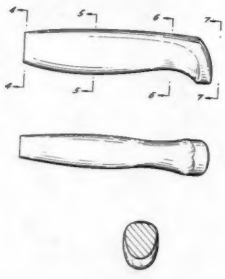
283,965
PORTABLE BAR
Jean Fitou, Cognac, France, assignor to Societe des Proprietaires Vinicoles de Cognac J. G. Minnot & Co., Cognac, France
Filed Oct. 31, 1983, Ser. No. 547,303
Term of patent 14 years
U.S. Cl. D7—70



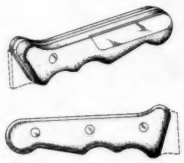
283,966
CONTAINER
Arthur R. Carlson, East Malvern, Australia, assignor to The Decor Corporation Proprietary Limited, Scoresby, Australia
Filed Mar. 22, 1983, Ser. No. 477,674
Claims priority, application Australia, Sep. 24, 1982, 1649/82
Term of patent 14 years
U.S. Cl. D7—76



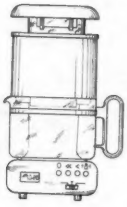
283,967
HANDLE FOR A KNIFE
Richard Cappadona, Ft. Lauderdale, Fla., and Kohei Iwatsuki, Nagoya, Japan, assignors to Carico Distributors Inc., Ft. Lauderdale, Fla.
Filed Jan. 20, 1984, Ser. No. 572,641
Term of patent 14 years
U.S. Cl. D7—152

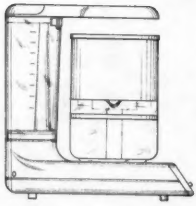


283,968
KNIFE HANDLE
Carl D. Marquis, Newton, Iowa, assignor to The Vernon Company, Newton, Iowa
Filed Apr. 6, 1984, Ser. No. 597,355
Term of patent 14 years
U.S. Cl. D7—152

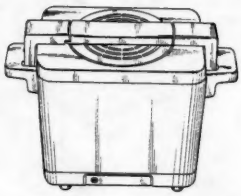


283,969
ELECTRIC COFFEEMAKER
Roger Sastre, Dijon, France, assignor to SEB, Selongey, France
Filed Feb. 14, 1984, Ser. No. 580,550
Claims priority, application France, Aug. 18, 1983, 83 3067
Term of patent 14 years
U.S. Cl. D7—309

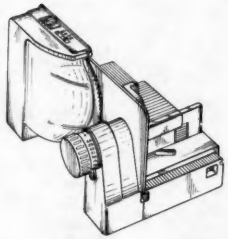




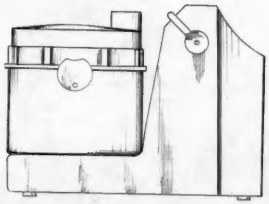
283,970
DEEP FRYER
Jean M. Thevenin, Fontaine Francaise, France, assignor to SEB, Selongey, France
Filed Aug. 15, 1983, Ser. No. 523,284
Claims priority, application France, Mar. 2, 1983, 83 0784
Term of patent 14 years
U.S. Cl. D7—360



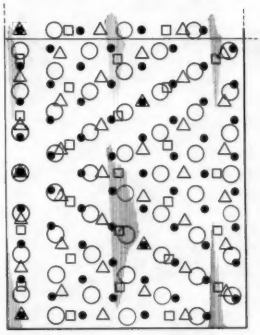
283,971
SLICING MACHINE
Albrecht Friz, Giengen, Fed. Rep. of Germany, assignor to Bosch-Siemens Hausgerate GmbH, Stuttgart, Fed. Rep. of Germany
Filed Aug. 3, 1983, Ser. No. 519,825
Claims priority, application Fed. Rep. of Germany, Feb. 3, 1983, MR 5571
Term of patent 14 years
U.S. Cl. D7—383



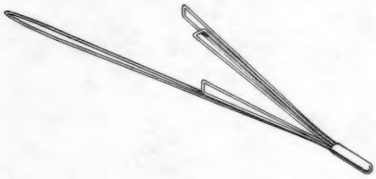
283,972
FOOD PROCESSOR
Olivier H. C. Prevot, Aubusson, France, assignor to Dito-Sama, Aubusson, France
Filed Jun. 10, 1983, Ser. No. 503,345
Term of patent 14 years
U.S. Cl. D7—384



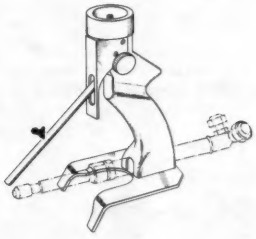
283,973
MODULAR TEMPLATE HORTICULTURAL FILM FOR COLLOCATION OF POTTED PLANTS
Erling Hougaard, Jyllinge, Denmark, assignor to Os Plastic A/S, Farum, Denmark
Filed Dec. 9, 1983, Ser. No. 559,804
Claims priority, application Denmark, Jun. 10, 1983, 570/83
Term of patent 14 years
U.S. Cl. D8—1



283,974
COMBINED FID AND STITCHER FOR SPLICING BRAIDED LINE
James D. McGrew, 8120 Rio Linda Blvd., Elverta, Calif. 95626
Filed Dec. 12, 1983, Ser. No. 560,711
Term of patent 14 years
U.S. Cl. D8—14

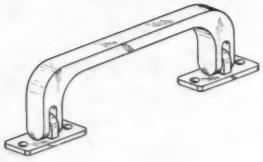


283,975
COMBINED STAND AND HAND GRIP FOR FLAME SPRAYING DEVICE
James Y. Anderson, 2119 Atlantic Blvd., Los Angeles, Calif. 90040
Filed Apr. 13, 1983, Ser. No. 484,451
Term of patent 14 years
U.S. Cl. D8—30



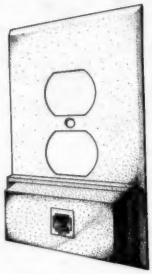
283,976
TRUCK DRIVER'S HAMMER
Harold C. Graves, 2306 Judy St., Amarillo, Tex. 79106
Filed May 27, 1983, Ser. No. 498,819
Term of patent 14 years
U.S. Cl. D8—75

283,977
HANDLE FOR AN ATTACHE CASE AND POSTS THEREFOR
Herold Kunzler, 81 N. Forest Ave., Rockville Centre, N.Y. 11570
Filed Sep. 4, 1984, Ser. No. 646,525
Term of patent 14 years
U.S. Cl. D8—301



283,978
KEY BLANK
Laurence P. Mills, Crows Nest, Australia, assignor to Taboola Pty. Limited, Crows Nest, Australia
Filed Aug. 19, 1983, Ser. No. 524,823
Term of patent 14 years
U.S. Cl. D8—347

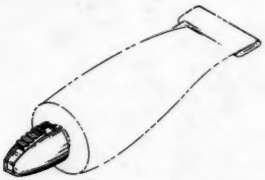
283,979
COMBINED POWER AND TELEPHONE WALL PLATE
Jaime R. Arnett, Fortville; Charles L. Krumreich, and Edgar E. Whetsel, both of Indianapolis, all of Ind., assignors to AT&T Information Systems, Morristown, N.J.
Filed Jun. 3, 1985, Ser. No. 740,694
Term of patent 14 years
U.S. Cl. D8—353



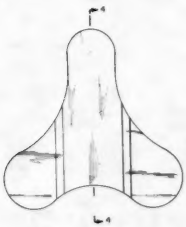
283,980
BOTTLE
Robert F. Haswell, 144, Kirkdale, London, SE26 4BB, England
Filed Jun. 29, 1983, Ser. No. 509,021
Term of patent 14 years
U.S. Cl. D9—307

283,981
PERFUME BOTTLE
Johnny H. Culbreath, 2551 W. Delta Ave., Long Beach, Calif. 90810
Filed Nov. 7, 1983, Ser. No. 549,394
Term of patent 14 years
U.S. Cl. D9—389

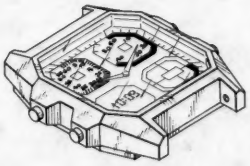
283,982
CAP FOR TUBE TYPE DISPENSERS
Kenneth A. Olson, 16414 Brookford, Houston, Tex. 77059
Filed Aug. 1, 1983, Ser. No. 519,525
Term of patent 14 years
U.S. Cl. D9—442



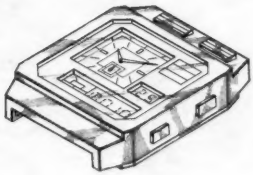
283,983
SEAL FOR A CONTAINER CAP OR OUTLET PORT
Lindon M. Fellows, and Beverly L. Heida, both of Denver County, Colo., assignors to Baxa Corporation, Denver, Colo.
Filed Oct. 5, 1983, Ser. No. 539,117
Term of patent 14 years
U.S. Cl. D9—499



283,984
WRIST WATCH
Hayao Kano, Saitama, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan
Filed Feb. 7, 1984, Ser. No. 577,665
Claims priority, application Japan, Dec. 12, 1983, 58-53340
Term of patent 14 years
U.S. Cl. D10—39

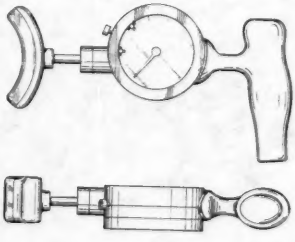


283,985
WRIST WATCH
Yasuyuki Sakamaki, Yokohama, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan
Filed Nov. 14, 1983, Ser. No. 551,139
Claims priority, application Japan, May 27, 1983, 58-22576
Term of patent 14 years
U.S. Cl. D10—39

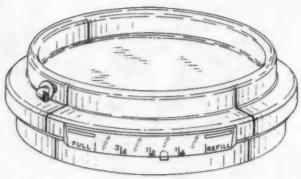


283,986
EXPANSIBLE PROPORTIONAL RULE
Gary M. Sogorka, 78 Gould Rd., New Foundland, N.J. 07435
Filed Apr. 13, 1983, Ser. No. 484,481
Term of patent 14 years
U.S. Cl. D10—71

283,987
HAND HELD DYNAMOMETER
Gary L. Smidt, 8 West Park Rd., Iowa City, Iowa 52240
Filed Oct. 12, 1983, Ser. No. 541,320
Term of patent 14 years
U.S. Cl. D10—83



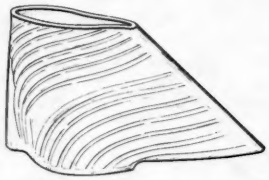
283,988
FUEL GAUGE FOR PROPANE TANK
Charles A. Krehel, Trumbull, and George N. Kaniwec, Southington, both of Conn., assignor to The Cooper Thermometer Company, Middlefield, Conn.
Filed Oct. 6, 1983, Ser. No. 539,477
Term of patent 14 years
U.S. Cl. D10—101



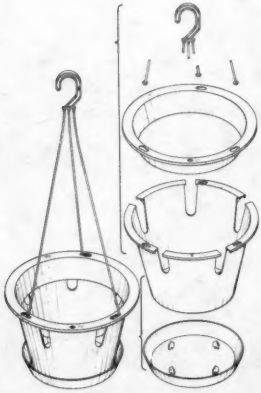

283,989
HEAT COLLECTOR FOR SMOKE ALARM
Laurence Chen, 1116 Via Zumaya, Rancho Palos Verdes, Calif. 90274
Filed Aug. 9, 1984, Ser. No. 39,244
Term of patent 14 years
U.S. Cl. D10—106

283,990
COMBINED SUPPORT, MEDALLION AND TASSEL PENDANT
Bruce B. G. Davidson, P.O. Box 218, Lynnwood, Wash. 98036
Filed Jan. 12, 1984, Ser. No. 570,461
Term of patent 14 years
U.S. Cl. D11—97

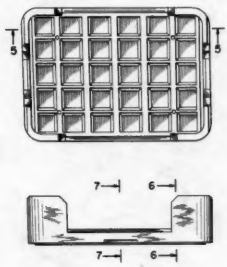
283,991
VASE
Johan van Loon, Haagweg, Netherlands, assignor to Rosenthal Aktiengesellschaft Rechtsabteilung, Fed. Rep. of Germany
Filed Aug. 23, 1984, Ser. No. 643,661
Claims priority, application Fed. Rep. of Germany, Feb. 23, 1984, 7368
Term of patent 14 years
U.S. Cl. D11—143



283,992
HANGING PLANTER
Donald L. Tendrup, 32 Del Marie La., Nesconset, N.Y. 11767, and Joseph P. Devito, 7 Ingrid Ct., Hauppauge, N.Y. 11729
Filed Oct. 29, 1984, Ser. No. 665,571
Term of patent 14 years
U.S. Cl. D11—148

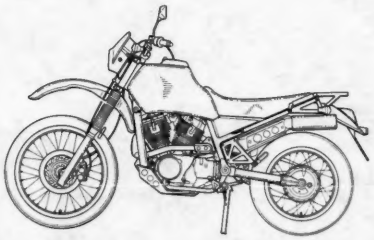


283,993
**BOX FOR CULTIVATING VEGETABLES OR THE LIKE**
Toshiro Kaneko, 20-3, Nakashinden, Yaizu-shi, Shizuoka-ken, Japan
Filed Dec. 23, 1983, Ser. No. 565,181
Term of patent 14 years
U.S. Cl. D11—155

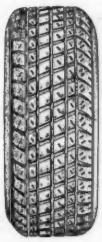



283,994
**TRANSPORTABLE REFRESHMENT STAND**
George Perry, Daytona Beach, Fla., assignor to G.B.P., Inc., Holly Hill, Fla.
Filed Apr. 8, 1983, Ser. No. 483,262
Term of patent 14 years
U.S. Cl. D12—83

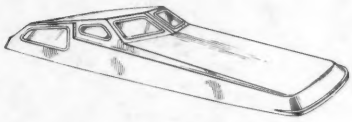
283,995
**MOTORCYCLE**
Mitsuyoshi Kohama, and Takeshi Oba, both of Tokyo, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 18, 1983, Ser. No. 476,826
Claims priority, application Japan, Sep. 29, 1982, 57-44500
Term of patent 14 years
U.S. Cl. D12—110



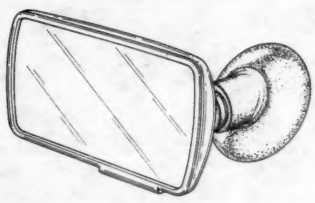
283,996
**AUTOMOBILE TIRE**
Izumi Kuramochi; Hiroshi Tokizaki, both of Tokyo; Isamu Irie; Daisuke Higashide, both of Hiratsuka, and Atsunori Agari, Hadano, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan
Filed Dec. 8, 1983, Ser. No. 559,285
Claims priority, application Japan, Jun. 9, 1983, 58-24528
Term of patent 14 years
U.S. Cl. D12—147



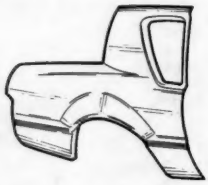
283,997
**REPLACEMENT VAN TOP**
Paul E. Thomas, 1808 Mill La., Dothan, Ala. 36303
Filed Nov. 20, 1984, Ser. No. 673,774
Term of patent 14 years
U.S. Cl. D12—156



283,998
**PORTABLE MIRROR FOR VEHICLES**
Yoshihisa Tanaka, Ichikawa, Japan, assignor to Tanaka Mfg. Co. Ltd., Tokyo, Japan
Filed Jan. 17, 1983, Ser. No. 458,863
Term of patent 14 years
U.S. Cl. D12—187

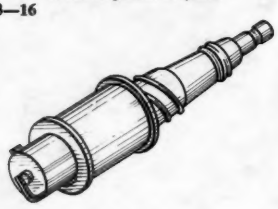


283,999
AUTOMOBILE QUARTER PANEL
John J. Telnack, Grosse Ile, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Filed Feb. 28, 1983, Ser. No. 470,865
Term of patent 14 years
U.S. Cl. D12—196

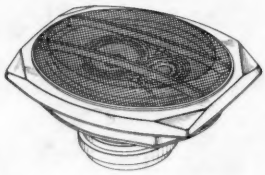


284,000
VEHICLE WHEEL
Martin Braungart, Alpirsbach, Fed. Rep. of Germany, assignor to BBS Kraftfahrzeugtechnik, GmbH & Co. KG, Schiltach, Fed. Rep. of Germany
Filed Jan. 20, 1984, Ser. No. 572,365
Claims priority, application Hague, Jul. 21, 1983, 73364
Term of patent 14 years
U.S. Cl. D12—211

284,001
TWIST-LOCK SPARK PLUG
Floyd D. Harris, Rt. 5, Box 191, Amherst, Va. 24521
Filed Sep. 6, 1983, Ser. No. 529,362
Term of patent 14 years
U.S. Cl. D13—16



284,002
LOUDSPEAKER
You Takagi, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan
Filed Jun. 29, 1983, Ser. No. 509,086
Claims priority, application Japan, Jan. 7, 1983, 58-137
The portion of the term of this Patent subsequent to Jun. 17, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—30



284,003
TELEPHONE SET
Shuichi Tamura, Kanagawa, Japan, assignor to Yamatake - Honeywell Co., Ltd., Tokyo, Japan
Filed Feb. 16, 1984, Ser. No. 580,671
Claims priority, application Japan, Aug. 18, 1983, 58-36148
Term of patent 14 years
U.S. Cl. D14—56

284,004

TELEPHONE

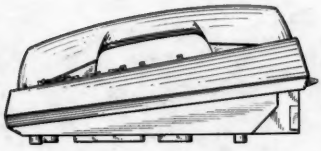
Him-Chi Yu, Kowloon, Hong Kong, assignor to Picotronics Industries Limited, Hong Kong, Hong Kong

Filed Dec. 27, 1983, Ser. No. 565,833

Claims priority, application United Kingdom, Jun. 29, 1983, 1013835

Term of patent 14 years

U.S. Cl. D14—58



284,005

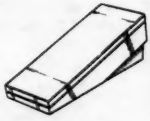
TELEPHONE SET ADD-ON ACCESSORY STAND

Robert B. Isaacs, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Mar. 5, 1984, Ser. No. 586,444

Term of patent 14 years

U.S. Cl. D14—59



284,006

PRINTER FOR DATA TERMINALS WITH RECEIPT/JOURNAL UNIT

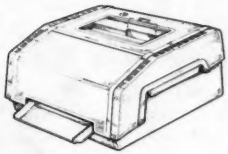
Ingvar Freijd, Linköping, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

Filed Sep. 14, 1983, Ser. No. 532,186

Claims priority, application Sweden, Mar. 25, 1983, 830879

Term of patent 14 years

U.S. Cl. D14—111



284,007

PRINTER FOR DATA TERMINALS WITH RECEIPT/JOURNAL UNIT

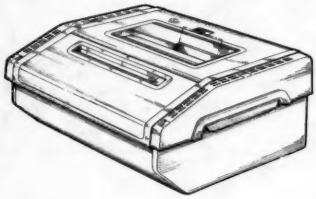
Ingvar Freijd, Linköping, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

Filed Sep. 14, 1983, Ser. No. 532,188

Claims priority, application Sweden, Mar. 25, 1983, 830880

Term of patent 14 years

U.S. Cl. D14—111



284,008

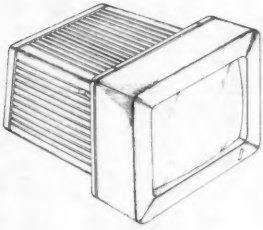
VIDEO DISPLAY FOR USE WITH A COMPUTER

Hartmut H. Esslinger; Stephen Peart, both of Los Gatos, and William G. MacKenzie, San Jose, all of Calif., assignors to Apple Computer, Inc., Cupertino, Calif.

Filed Apr. 20, 1984, Ser. No. 602,657

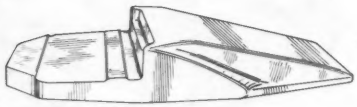
Term of patent 14 years

U.S. Cl. D14—113

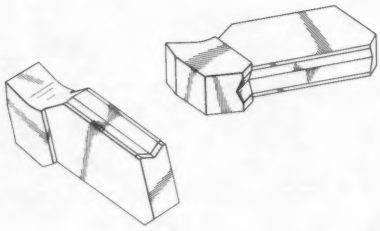


284,009
KEYBOARD PANEL
Thomas A. Anzelone, Fort Lauderdale, Fla., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Sep. 15, 1983, Ser. No. 532,645
Term of patent 14 years
U.S. Cl. D14—115

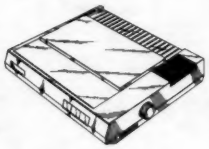
284,010
LOADER TOOTH FOR A FRONT END LOADER
Terry Voyce, Knektåsvägen 3 D, S-691 53 Karlskoga, Sweden
Filed Oct. 7, 1983, Ser. No. 539,890
Claims priority, application Sweden, Apr. 7, 1983, 830969
Term of patent 14 years
U.S. Cl. D15—29

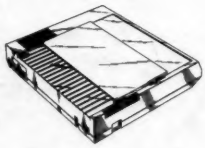


284,011
CUTTING INSERT
Joseph Pano, Nahariya, Israel, assignor to Iscar Ltd., Nahariya, Israel
Filed Nov. 29, 1983, Ser. No. 555,933
Claims priority, application Israel, Jun. 7, 1983, 9521
Term of patent 14 years
U.S. Cl. D15—139

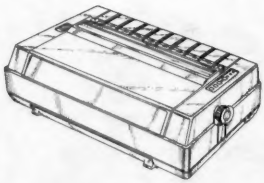


284,012
PRINTER
Toshio Mitsuhashi, Tokyo, Japan, assignor to Citizen Tokei Kabushiki Kaisha, Tokyo, Japan
Filed Jun. 13, 1984, Ser. No. 620,025
Claims priority, application Japan, Apr. 10, 1984, 59-14042
Term of patent 14 years
U.S. Cl. D18—13

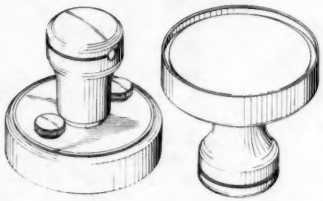




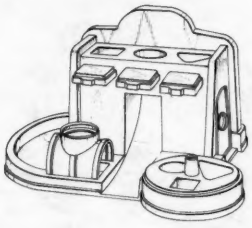
284,013
PRINTER
Nobufusa Kuroki, Machida, Japan, assignor to Janome Sewing Machine Co. Ltd., Tokyo, Japan
Filed Apr. 6, 1984, Ser. No. 597,526
Claims priority, application Japan, Mar. 21, 1984, 59-10622
Term of patent 14 years
U.S. Cl. D18—13



284,014
STAMP
Mitsuhiro Iwasaki, and Takashi Ichikawa, both of Nagoya, Japan, assignors to Shachihata Industrial Co., Ltd., Japan
Filed Jul. 10, 1984, Ser. No. 629,319
Claims priority, application Japan, Jan. 27, 1984, 59-2782
Term of patent 14 years
U.S. Cl. D18—15



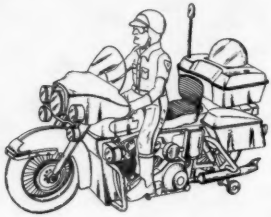
284,015
SHAPE TOY
Howard S. Kamentsky, Buffalo, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Feb. 9, 1984, Ser. No. 578,672
Term of patent 14 years
U.S. Cl. D21—59



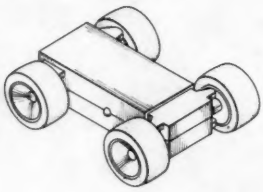
284,016
SIMULATIVE BALLOON
Margaret D. Davis, 2313 Dunsmuir St., Los Angeles, Calif. 90016
Filed Jun. 27, 1983, Ser. No. 508,173
Term of patent 14 years
U.S. Cl. D21—84

284,017
TOY CALCULATOR
M. Allyson Smith, Elma, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Feb. 2, 1984, Ser. No. 576,258
Term of patent 14 years
U.S. Cl. D21—109

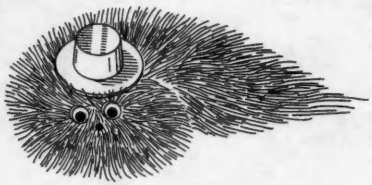
284,018
TOY MOTORCYCLE
Johnny K. Lin, Norwalk, Calif., assignor to 3L Plastics USA, Inc., Norwalk, Calif.
Filed Mar. 2, 1984, Ser. No. 585,402
Term of patent 14 years
U.S. Cl. D21—134



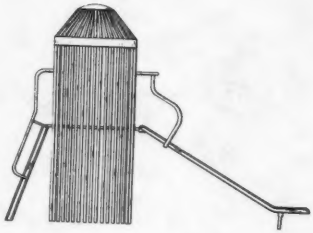
284,019
TOY VEHICLE CHASSIS
Fujio Arigaya, Tokyo, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Filed Nov. 7, 1983, Ser. No. 549,664
Claims priority, application Japan, Apr. 10, 1983, 58-43095
Term of patent 14 years
U.S. Cl. D21—141



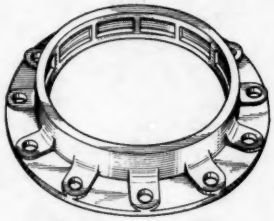
284,020
NOVELTY TOY FIGURE
LaDonna S. Henson, R.F.D. 4, State Rte. 18, Norwalk, Ohio 44857
Filed Dec. 27, 1983, Ser. No. 565,969
Term of patent 14 years
U.S. Cl. D21—148



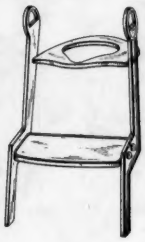
284,021
SILO PLAYGROUND CLIMBER AND SLIDE
Keith A. Addleman, Hillsdale, Mich., assignor to Quality Industries, Inc., Hillsdale, Mich.
Filed Oct. 24, 1983, Ser. No. 544,485
Term of patent 14 years
U.S. Cl. D21—244



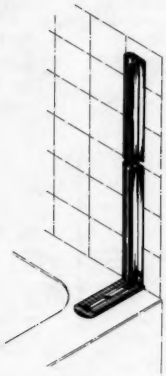
284,022
BACKING RING FOR A PIPE COUPLING
Laverne J. Milot, and Kenneth D. Werbowy, both of Mississauga, Canada, assignors to Canron Inc., Toronto, Canada
Filed Sep. 9, 1983, Ser. No. 530,654
Claims priority, application Canada, Mar. 29, 1983, 29-03-83-23
Term of patent 14 years
U.S. Cl. D23—43



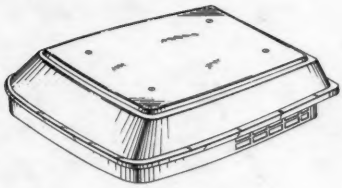
284,023
TOILET SEAT FOR INFANTS
Mordecai Lipski, Industrial Quarter, Herzlia, Israel
Filed Dec. 13, 1983, Ser. No. 560,823
Claims priority, application Israel, Jul. 5, 1983, 9548
Term of patent 14 years
U.S. Cl. D23—53



284,024
CLAMPING STRIP FOR SHOWER CURTAIN
John C. Olson, Everett, Wash., assignor to Johnny Olson and Company, Inc., Everett, Wash.
Filed Jul. 27, 1983, Ser. No. 517,886
Term of patent 14 years
U.S. Cl. D23—69

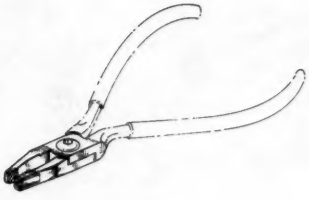


284,025
ROOF-TOP AIR CONDITIONER CABINET FOR A VEHICLE
William H. Armstrong, Troy, Mich., assignor to The Duo-Therm Corporation, Del.
Filed Jul. 30, 1984, Ser. No. 635,622
Term of patent 14 years
U.S. Cl. D23—142

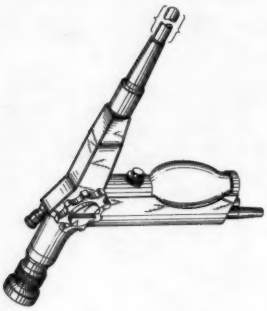


284,026
OXYGEN CONCENTRATOR
Norman R. McCombs, Tonawanda, N.Y., assignor to Greene & Kellogg, Inc., Tonawanda, N.Y.
Filed Jun. 7, 1985, Ser. No. 742,516
Term of patent 14 years
U.S. Cl. D24—1.1

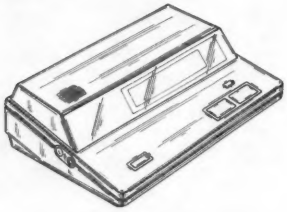
284,027
TIPS FOR ORTHODONTIC BAND-SEATING PLIER
Gary L. Johnson, Monrovia, Calif., assignor to E.T.M. Corporation, Monrovia, Calif.
Filed Sep. 19, 1983, Ser. No. 533,110
Term of patent 14 years
U.S. Cl. D24—16



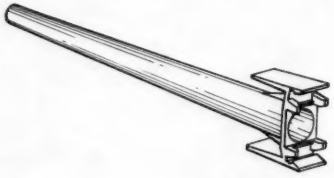
284,028
SIGMOIDOSCOPE
Richard H. Seager, West Mystic, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.
Filed Jan. 10, 1983, Ser. No. 456,947
Term of patent 14 years
U.S. Cl. D24—18



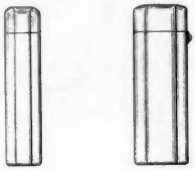
284,029
DIGITAL SPHYGMOMANOMETER
Hiroshi Nishibori, and Harumi Fukuda, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Dec. 30, 1983, Ser. No. 567,073
Claims priority, application Japan, Jul. 7, 1983, 58-29725
Term of patent 14 years
U.S. Cl. D24—21



284,030
SHIELD FOR HYPODERMIC NEEDLE
Richard H. McFarlane, 2571 Kaneville Rd., Geneva, Ill. 60134
Filed Jun. 2, 1983, Ser. No. 500,452
Term of patent 14 years
U.S. Cl. D24—25



284,031
LIGHTER
Pierre Ludvig, St-Nom la Breteche, and Gerard Flandin, 11 Rue Alfred Dehodencq, 75016 Paris, both of France, assignors to Gerard Flandin, Paris, France
Filed May 8, 1984, Ser. No. 608,147
Term of patent 14 years
U.S. Cl. D27—36



284,032
BACK MASSAGER
Gregory S. Wahl, and Randy L. Miller, both of Sterling, Ill., assignors to Wahl Clipper Corporation, Sterling, Ill.
Filed Dec. 20, 1983, Ser. No. 563,682
Term of patent 14 years
U.S. Cl. D24—36

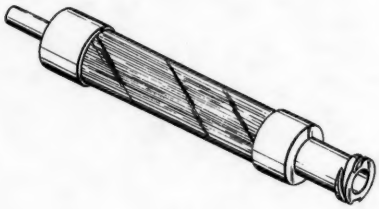
284,033
INTRAVENOUS BOTTLE
David L. Brodsky, Providence, R.I., assignor to Superior Healthcare Group, Inc., Cumberland, R.I.
Filed Oct. 24, 1983, Ser. No. 545,734
Term of patent 14 years
U.S. Cl. D24—52

284,034

**INTRAVENOUS LINE FILTER**

David L. Grime, Newport Beach, Calif., assignor to Kendall McGaw Laboratories, Inc., Irvine, Calif.

Filed May 11, 1983, Ser. No. 493,730
Term of patent 14 years
U.S. Cl. D24—52

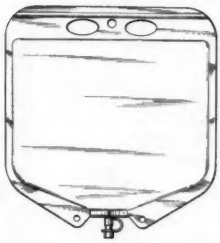


284,035

**CHEMICAL CONTAINER**

Marc de Leeuwe, Aptos, Calif., and Jeffrey S. Beitel, Cheshire, Conn., assignors to Union Carbide Corporation, Danbury, Conn.

Filed May 23, 1983, Ser. No. 497,262
Term of patent 14 years
U.S. Cl. D24—58



# LIST OF PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 27TH DAY OF MAY, 1986

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A/S Sonnichsen Rorvalseverket: *See—*
Boen, Per, 4,591,323, Cl. 425-97.000.

Abatti, C. Alex; and Urmston, Robert. Field crop harvesting system. 4,590,739, Cl. 53-391.000.

Abe, Seiko: *See—*
Yoshinaga, Toru; Sakakibara, Yasuyuki; Abe, Seiko; Watanabe, Kazuhide; and Natsuyama, Yukihiro, 4,590,908, Cl. 123-357.000.

Abe, Yoshio: *See—*
Hoshi, Hideaki; Okumura, Jun; Naito, Takayuki; Abe, Yoshio; and Aburaki, Shimpei, 4,591,641, Cl. 544-16.000.

ABM Industries, Inc.: *See—*
Schwarzberger, Michael, 4,590,877, Cl. 112-262.300.

Aburaki, Shimpei: *See—*
Hoshi, Hideaki; Okumura, Jun; Naito, Takayuki; Abe, Yoshio; and Aburaki, Shimpei, 4,591,641, Cl. 544-16.000.

Accetta, Joseph S.; Galan, Louis; Hamilton, Patrick D.; and Amick, James L., to Photon Sources, Inc. Pulsed gas lasers having flexible exit gas lines. 4,592,063, Cl. 372-58.000.

Ace Controls, Inc.: *See—*
Kirst, Karl O. R., 4,591,031, Cl. 188-287.000.

Acorcey, Robert R.: *See—*
Malis, Jerry L.; Malis, Leonard I.; Acorcey, Robert R.; and Solt, David, 4,590,934, Cl. 128-303.140.

Acton, Edward M.; and Tong, George L., to SRI International. Open chain-morpholino adriamycins. 4,591,637, Cl. 536-6.400.

Adachi, Yutaka. Method of making hockey sticks. 4,591,155, Cl. 273-67.00A.

Adelmann, Manfred, to ALKEM GmbH. Pressing device for producing compacts from source material in powder form, in particular pulverized nuclear reactor fuel. 4,591,326, Cl. 425-256.000.

Ades, Adrian R.; and Schmidt, George S., to General Electric Company. Turbine rotor heating, disassembly, handling and reassembly method and apparatus. 4,590,653, Cl. 29-156.80R.

Adolph Coors Company: *See—*
Moen, Bruce A., 4,591,066, Cl. 220-69.000.

Advanced Micro Devices, Inc.: *See—*
Campbell, David L., 4,591,737, Cl. 307-272.00A.

Advanced Technology Laboratories, Inc.: *See—*
Hilse, Gernot R. K., 4,591,355, Cl. 604-159.000.

Agback, Karl H., to Pharmacia AB. Azo-bis-salicylic acid and salt thereof, to treat inflammatory conditions of the intestine. 4,591,584, Cl. 514-160.000.

Agence Spatiale Europeenne: *See—*
Pennoni, Giovanni, 4,591,730, Cl. 370-104.000.

Agfa-Gevaert AG: *See—*
Heidrich, Gunter; and Payrhammer, Bernd, 4,591,083, Cl. 226-91.000.
Hosel, Peter; and Plaschke, Herbert, 4,590,738, Cl. 53-266.00R.

Agfa-Gevaert Aktiengesellschaft: *See—*
Fergg, Berthold, 4,591,263, Cl. 355-43.000.
Illig, Egon; Gentischer, Josef; and Schmutz, Wolfgang, 4,591,140, Cl. 271-11.000.

Agrifurane S.A.: *See—*
Delmas, Michel; Gaset, Antoine; and Le Bigot, Yves, 4,591,651, Cl. 549-473.000.

Ahlen, Hans O. S., to Institutet for Optisk Forskning. Dispersive optical device. 4,591,270, Cl. 356-333.000.

Ahrgren, Leif G.; and de Belder, Anthony N., to Pharmacia AB. Dextran or crosslinked dextran having quaternary amino groups. 4,591,638, Cl. 536-51.000.

Air Products and Chemicals, Inc.: *See—*
Holzl, Robert A., 4,591,514, Cl. 427-249.000.

Aisan Kogyo Kabushiki Kaisha: *See—*
Sato, Yoji; and Yamamoto, Keiichi, 4,591,699, Cl. 219-497.000.

Aisin Seiki Kabushiki Kaisha: *See—*
Mohri, Kaneo; and Kageyama, Toshinobu, 4,591,788, Cl. 324-260.000.
Yasuda, Tomio, 4,591,014, Cl. 180-79.100.

Ajinomoto Co., Inc.: *See—*
Koumura, Ichiro; Kanou, Hideo; Okunishi, Masahiko; and Yamada, Kazuhiko, 4,591,554, Cl. 435-18.000.
Kurahashi, Osamu; Tsuchida, Takayasu; Kawashima, Hiroki; and Enei, Hitoshi, 4,591,562, Cl. 435-108.000.

Ajioka, James S.: *See—*
Mulliner, Richard R.; and Ajioka, James S., 4,591,088, Cl. 228-121.000.

Akabane, Makoto: *See—*
Watari, Masao; Akabane, Makoto; Nishioka, Hisao; and Waku, Toshihiko, 4,592,085, Cl. 381-43.000.

Akahane, Shoji; Hirota, Kazuo; and Tomioka, Kentaro, to G-C Dental Industrial Corp. Dental cement compositions. 4,591,384, Cl. 106-35.000.

Akao, Hideyuki, to Sharp Kabushiki Kaisha. Microwave oven display power supply. 4,591,681, Cl. 219-10.55B.

Akazawa, Takashi: *See—*
Hagiwara, Yoshimune; Sugiyama, Shizuo; Maeda, Narimichi; Yumoto, Osamu; Akazawa, Takashi; Kobayashi, Masahito; Kita, Yasuhiro; and Kita, Yuzo, 4,592,006, Cl. 364-748.000.

Akesson, Stig H. Method and machine for packing a rope into a container. 4,590,742, Cl. 53-430.000.

Akiba, Yutaka; and Hirota, Kazuo, to Hitachi, Ltd. Magnetic bubble memory device. 4,592,014, Cl. 365-1.000.

Akiba, Yutaka; and Hirota, Kazuo, to Hitachi, Ltd. Magnetic bubble memory module. 4,592,015, Cl. 365-2.000.

Akima, Toshio: *See—*
Kawai, Hiromasa; Morinaga, Takashi; Miyajima, Hiromu; Akima, Toshio; Kato, Mitsuharu; and Hosoi, Yutaka, 4,591,626, Cl. 526-282.000.

Akiyama, Hirokazu, to Q. P. Corporation. Optical egg inspecting apparatus. 4,591,723, Cl. 250-461.100.

Akkerman, Neil H., to AVA International Corp. Wire line running and/or pulling tool. 4,591,197, Cl. 294-86.240.

Aktiebolaget IRO: *See—*
Tholander, Lars H. G., 4,591,107, Cl. 242-47.010.

Alam, Naveed. Digit manipulative data input key. 4,591,702, Cl. 235-1.00R.

Aldinger, Fritz; Keilberth, Richard; and Werdecker, Waltraud, to W. C. Heraeus GmbH. Combination of $AlN$-$Y_2O_3$ heat conductive ceramic substrate and electronic component. 4,591,537, Cl. 428-698.000.

Aldred, Alan C. G.; and Fogg, Sidney G., to British Petroleum Company p.l.c., The. Thermoplastic elastomer composition. 4,591,615, Cl. 525-179.000.

Alemanni, James C., to Gibson-Egan Company. Integrated circuit carrier. 4,591,053, Cl. 206-331.000.

ALKEM GmbH: *See—*
Adelmann, Manfred, 4,591,326, Cl. 425-256.000.

All American Inc.: *See—*
Wolfe, Robert A.; and Gleisner, Donald, 4,590,622, Cl. 2-2.000.

Allemand, Charly D.: *See—*
Demers, Donald R.; and Allemand, Charly D., 4,591,267, Cl. 356-316.000.

Allen-Stevens Corp.: *See—*
Campodonico, Salvatore I., 4,590,708, Cl. 49-181.000.

Allgaier, Richard L., Jr.: *See—*
Nickels, Richard C., Jr.; and Allgaier, Richard L., Jr., 4,590,853, Cl. 101-93.480.

Allied Corporation: *See—*
Lofquist, Robert A.; Weedon, Gene C.; and Cole, Charles J., 4,591,473, Cl. 264-129.000.
Major, Jeffrey T.; and Hall, Robert D., 4,591,750, Cl. 310-237.000.

Alpma Alpenland Maschinenbau & Co. KG: *See—*
Hain, Gottfried; and Krebs, Karl-Heinz, 4,590,833, Cl. 83-367.000.

Alps Electric Co., Ltd.: *See—*
Aratani, Tetsuo, 4,591,932, Cl. 360-74.100.
Numata, Hidetaka, 4,591,773, Cl. 318-663.000.
Takeuchi, Shuhei, 4,591,882, Cl. 346-136.000.
Tsukamoto, Akihito, 4,592,075, Cl. 375-81.000.

Alsthom-Atlantique: *See—*
Sabrie , Jean-Louis, 4,591,776, Cl. 318-717.000.

Altmann, Franz; Granz, Bernd; Grenda, Dieter; and Oppelt, Ralph, to Siemens Aktiengesellschaft. Array apparatus for reading-out a two-dimensional charge image. 4,592,029, Cl. 367-7.000.

Amano, Atsushi: *See—*
Tanikawa, Kouji; Matsui, Koichi; Taniguchi, Akira; Amano, Atsushi; Kanno, Masahide; and Takahashi, Yutaka, 4,590,924, Cl. 128-6.000.

Amer, Nabil M., to United States of America, Energy. Photothermal method for in situ microanalysis of the chemical composition of coal samples. 4,591,718, Cl. 250-339.000.

American Cyanamid Company: *See—*
Campbell, Jay E.; Reichmann, Richard H.; and Li, Lehmann K., 4,591,086, Cl. 227-19.000.
Conrow, Ransom B.; and Bernstein, Seymour, 4,591,604, Cl. 514-577.000.
Deniega, Jose C., 4,590,937, Cl. 128-325.000.
Foley, Henry C.; and O'Toole, Michael P., 4,591,578, Cl. 502-185.000.
Karam, Fouad T.; and Sibalis, Jack I., 4,591,613, Cl. 524-597.000.

American Hospital Supply Corp.: *See—*
Eldridge, John D., Jr., 4,591,048, Cl. 206-63.300.
McPhee, Charles J., 4,592,092, Cl. 383-80.000.

American Manufacturing Company, Inc.: *See—*
Houpt, Grover K., 4,591,950, Cl. 361-399.000.

American Medical Systems, Inc.: *See—*
Porter, Christopher H.; and Kuyava, Charles C., 4,590,927, Cl. 128-79.000.

American Meter Company: *See—*
Hicks, Irwin A.; Jacobsen, Robert S.; Kee, David F.; and Schneider, George W., Jr., 4,590,790, Cl. 73-3.000.

Ametek, Inc.: *See—*
Reed, Charles J.; and Heit, Henry R., 4,590,791, Cl. 73-4.00R.

Amfac Foods Monterey, Inc.: *See—*
Davidson, Arthur R.; and Livermore, Richard S., 4,590,829, Cl. 83-22.000.

Amick, James L.: *See—*
Accetta, Joseph S.; Galan, Louis; Hamilton, Patrick D.; and Amick, James L., 4,592,063, Cl. 372-58.000.

AMP Incorporated: *See—*
Dornes, Bryan J.; Kautz, Jon F.; Paukovits, Edward J., Jr.; Spong, Richard V.; Talarico, Robert J.; and Prescott, Harry G., 4,590,673, Cl. 29-845.000.
Shaffer, Howard R., 4,591,222, Cl. 339-74.00R.

Ampex Corporation: *See—*
Kudelski, Stefan, 4,591,768, Cl. 318-327.000.
Trytko, David E., 4,591,925, Cl. 358-336.000.

Amstore Corporation: *See—*
Amstutz, Douglas D.; and Kelemen, Donald D., 4,591,058, Cl. 211-94.000.

Amstutz, Douglas D.; and Kelemen, Donald D., to Amstore Corporation. Slatboard. 4,591,058, Cl. 211-94.000.

Anderson, Daniel J.: *See—*
Brown, Richard L.; Anderson, Daniel J.; and Lickus, Leonard J., 4,590,650, Cl. 29-33.00M.

Anderson, Ronald C. Screen printing method and apparatus. 4,590,854, Cl. 101-35.000.

Anderson, Thomas E.: *See—*
Willard, Henry G.; and Anderson, Thomas E., 4,591,942, Cl. 361-97.000.

Anderson, Thomas R.; Skolnik, Howard L.; and Trump, Bruce C., to Burr-Brown Corporation. Multiple input port circuit having temperature zero voltage offset bias means. 4,591,740, Cl. 307-310.000.

Anderson, Warren A.: *See—*
Sternberg, Robert L.; and Anderson, Warren A., 4,591,864, Cl. 343-754.000.

Ando, Hideo: *See—*
Kawaguchi, Hideo; Ando, Hideo; and Watanabe, Yasuhiko, 4,590,870, Cl. 112-70.000.

Ando, Hiromi: *See—*
Tateoka, Kiyoshi; and Ando, Hiromi, 4,590,845, Cl. 91-369.00A.

Ando, Minato; Ito, Masaaki; and Mizuno, Fumio, to NGK Spark Plug Co., Ltd. Alumina porcelain composition. 4,591,574, Cl. 501-136.000.

Andors Analyzers Incorporated: *See—*
Wong, Jacob Y., 4,591,721, Cl. 250-373.000.

Andover Controls Corporation: *See—*
Mattes, Donald A.; Landry, Steven G.; and Kendall, James M., 4,591,967, Cl. 364-132.000.

Andrevski, Zygmunt M., to RCA Corporation. Television camera with solid-state imagers mounted to a prism. 4,591,901, Cl. 358-50.000.

Andrew Corporation: *See—*
Morris, John P., 4,590,785, Cl. 72-392.000.

Andrews, John R.; Stewart, Philip S. B.; and Hurst, George T., to ICI Australia Limited; and Woods Reef Mines Ltd. Asbestos process. 4,591,103, Cl. 241-4.000.

Andrews, Lawrence F. Orthodontic positioner and method of manufacturing same. 4,591,341, Cl. 433-6.000.

Andrews, Robert S., to Nelson Research & Development Co. Flash chromatography. 4,591,442, Cl. 210-656.000.

Androsenko, Alexandr P.: *See—*
Shaginian, Albert S.; Pevnev, Anatoly A.; Asan-Dzhalalov, Alexei G.; Androsenko, Alexandr P.; Palkin, Leonid N.; and Klimovich, Elena I., 4,591,007, Cl. 175-85.000.

Angeloff, Lloyd G., to Grumman Aerospace Corporation. Portable, adjustable structure and method of erecting same. 4,590,718, Cl. 52-116.000.

Anker Labelers Corp.: *See—*
Von-Meyer, Claas, 4,591,403, Cl. 156-364.000.

Anslow, Gabriel T.: *See—*
Rosky, Leon; Anslow, Gabriel T.; Spaniola, Daniel F.; and Weintraub, Marvin H., 4,590,914, Cl. 123-557.000.

Antkowiak, Robert G., to Tayco Developments, Inc. Elastomeric damped shock absorber. 4,591,030, Cl. 188-268.000.

Antonelli, Joseph A.; and Hazan, Isidor, to Du Pont de Nemours, E. I., and Company. Coating composition of an acrylic polymer, a dispersed acrylic polymer and an alkylated melamine crosslinking agent. 4,591,533, Cl. 428-520.000.

Antonelli, Michael J. Device for carrying wood and the like. 4,591,201, Cl. 294-137.000.

Aoi, Tomio: *See—*
Nakajima, Tetsuo; and Aoi, Tomio, 4,591,986, Cl. 364-426.000.

Aoki, Hideji: *See—*
Shimizu, Shokichi; Aoki, Hideji; Kida, Susumu; and Kanazawa, Yuki, 4,590,672, Cl. 29-827.000.

Aoki, Hirokazu: *See—*
Sekiguchi, Yoshihiro; Yoshida, Kazutoshi; Chiba, Shinsaku; Sugie, Mamoru; and Aoki, Hirokazu, 4,592,016, Cl. 365-15.000.

Aono, Yasuhiro; and Matsumoto, Koichi, to Nippon Kogaku K. K. Zoom lens. 4,591,244, Cl. 350-427.000.

Aota, Jiro: *See—*
Kurauchi, Makoto; Kobayashi, Takeshi; Izumi, Masakazu; and Aota, Jiro, 4,590,724, Cl. 52-223.00L.

Aprica Kassai Kabushikikaisha: *See—*
Kassai, Kenzou, 4,591,176, Cl. 280-47.360.

APX Group Inc.: *See—*
Harwood, Jon W., 4,590,652, Cl. 29-157.00R.

Arai, Kozo: *See—*
Fuse, Yoshiro; Naganuma, Takao; Fujimori, Akiyoshi; Arai, Kozo; Igarashi, Katsutoshi; and Naito, Yuzi, 4,591,724, Cl. 250-492.100.

Arai, Tomio: *See—*
Gomi, Shimpei; Arai, Tomio; Mogi, Fumio; Nakagawa, Takao; Miura, Kunio; and Otani, Sugio, 4,591,424, Cl. 208-40.000.

Araiza, Sil. Electrical connector. 4,591,224, Cl. 339-97.00C.

Arakawa, Yoshio: *See—*
Yokoyama, Kazumasa; Fukaya, Chikara; Isuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,591,593, Cl. 514-307.000.
Yokoyama, Kazumasa; Fukaya, Chikara; Tsuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,591,599, Cl. 514-413.000.

Aratani, Tetsuo, to Alps Electric Co., Ltd. Auto-reverse mechanism for tape recorders. 4,591,932, Cl. 360-74.100.

Arbree, Roberta R.; Degulis, David C.; Goodwin, Henry W.; and Veillette, Norman T. Solvent resistant thermally printable material. 4,591,887, Cl. 346-200.000.

Arditty, Patricia; Arens, Georges; and Staron, Philippe, to Societe Nationale Elf Aquitaine, Division Propriete Industrielle Tour Elf. Method of seismic exploration by acoustic well logging. 4,592,030, Cl. 367-27.000.

Aremco Products, Inc.: *See—*
Pearsall, Jeannine A., 4,591,385, Cl. 106-38.300.

Arens, Georges: *See—*
Arditty, Patricia; Arens, Georges; and Staron, Philippe, 4,592,030, Cl. 367-27.000.

Argus Systems, Inc.: *See—*
Kyle, William F., 4,591,834, Cl. 340-566.000.

Arioka, Hiroyuki: *See—*
Nishimatsu, Masaharu; Ide, Toshiaki; Kubota, Yuichi; Saito, Yoshiaki; and Arioka, Hiroyuki, 4,591,528, Cl. 428-212.000.

Armco Inc.: *See—*
Steele, James H., Jr.; Heckler, Alan J.; Flowers, James W., Jr.; and Powley, George S., 4,591,395, Cl. 148-12.00D.

Armond, Joseph A., to Electro-Matic Products Co. Apparatus for demagnetizing a chuck. 4,591,943, Cl. 361-145.000.

Arnold, Werner: *See—*
Kruger, Tilmann; Arnold, Werner; and Scheumann, Leonhard, 4,591,728, Cl. 307-75.000.

Arredondo, Alonso. Technique for determining thread accuracy. 4,590,678, Cl. 33-199.00R.

Arsem, Harold B., to Eden Research Laboratories, Inc. Continuous freeze drying. 4,590,684, Cl. 34-5.000.

Asagi, Yasuyoshi; Ogawa, Noriaki; Kasai, Hitoshi; Hattori, Toshihiro; Ishihara, Masaki; and Uriuhara, Makoto, to Fujitsu Limited. Automatic clutch control system. 4,591,038, Cl. 192-0.073.

Asai, Eiichi: *See—*
Takano, Masao; and Asai, Eiichi, 4,591,922, Cl. 358-280.000.

Asakura, Osamu: *See—*
Nozaki, Mineo; Asakura, Osamu; Nagashima, Masasumi; and Uchikata, Yoshio, 4,591,876, Cl. 346-76.0PH.

Asan-Dzhalalov, Alexei G.: *See—*
Shaginian, Albert S.; Pevnev, Anatoly A.; Asan-Dzhalalov, Alexei G.; Androsenko, Alexandr P.; Palkin, Leonid N.; and Klimovich, Elena I., 4,591,007, Cl. 175-85.000.

Asano, Katsuaki: *See—*
Ouchi, Norikazu; Kayanuma, Akio; and Asano, Katsuaki, 4,591,398, Cl. 148-187.000.

Asano, Keisuke: *See—*
Fukuoka, Hiromi; Asano, Keisuke; and Ide, Hideo, 4,590,988, Cl. 164-463.000.

Asazawa, Hiroshi, to NEC Corporation. Feedback amplifier circuit including cascade connected field effect transistors. 4,591,802, Cl. 330-277.000.

ASEA Aktiebolag: *See—*
Lundstrom, Jan-Erik, 4,591,850, Cl. 340-799.000.

Ashiba, Masahiro, to Tokico Ltd. Hydraulic shock absorbing device of adjustable damping force type. 4,591,186, Cl. 280-707.000.

Ashland Oil, Inc.: *See—*
Kovach, Stephen M.; and Miller, Charles B., 4,591,425, Cl. 208-74.000.

Asscher, Jean-Claude, to Tekelec-Airtronic. Electrical element such as a tantalum and solid-electrolyte capacitor. 4,591,952, Cl. 361-433.000.

Astra Lakemedel Aktiebolag: *See—*
Helgstrand, Ake J. E.; Johansson, Karl N.; Misiorny, Alfons; Noren, Jan O.; and Stening, Goran B., 4,591,583, Cl. 514-120.000.

AT&T Bell Laboratories: *See—*
Beck, Patricia A., 4,591,392, Cl. 134-25.400.
Beckner, Mark W.; Davis, James A.; Gausmann, Eric J.; Hiller, Thomas L.; Olson, Philip D.; and Van Dine, Gilbert A., 4,592,048, Cl. 370-60.000.
Duttweiler, Donald L.; and Hartung, John, 4,591,669, Cl. 179-170.200.
Foster, Robert W.; Lottes, Rosanna M.; and Swinehart, Grant E., 4,591,665, Cl. 179-18.0FH.
Gossard, Arthur C.; and Petroff, Pierre M., 4,591,889, Cl. 357-4.000.

Huang, Alan; and O'Neill, Jay H., 4,592,019, Cl. 365-78.000.
Retotar, Daniel D., 4,591,963, Cl. 363-17.000.
Saleh, Adel A. M., 4,591,803, Cl. 330-277.000.
Scordo, Dominick, 4,591,660, Cl. 178-22.050.
Silfvast, William T., 4,592,064, Cl. 372-73.000.
Williams, Gareth F., 4,592,043, Cl. 370-3.000.

AT&T Information Systems Inc.: *See—*
Ferenc, James J., 4,592,044, Cl. 370-13.000.

Atago, Takeshi, to Hitachi, Ltd. Air-fuel ratio control apparatus for internal combustion engines. 4,590,912, Cl. 123-478.000.

Atkins, Harold W.: *See—*
Lightfoot, Benjamin H.; and Atkins, Harold W., 4,590,808, Cl. 73-862.480.

Atkinson, Alan W.; Dearden, Katryna J.; Doyle, Christina; Lancaster, Janet M.; Marshall, Kenneth H.; and Robinson, Kay L., to T & N Materials Research Limited. Gasket and process of making gaskets from exfoliated graphite. 4,591,166, Cl. 277-1.000.

Atobe, Masaaki: *See—*
Tanimoto, Yoshio; and Atobe, Masaaki, 4,591,797, Cl. 329-50.000.

Atochem: *See—*
Devic, Michel, 4,591,460, Cl. 260-369.000.

Attems, Franz. Device for bark-peeling tree trunks or the like. 4,590,979, Cl. 144-208.00F.

Attenni, Maurizio. Removable device for attaching a racket to a player's wrist. 4,591,156, Cl. 273-73.00J.

Aubert, Jean P.; Bracon, Roland; and Ravasy, Bernard, to Coflexip. Method and device for the manufacture of flexible tubular bodies. 4,590,752, Cl. 57-9.000.

Augoyard, Jean-Pierre; and Guggemos, Philippe, to GTM Entrepose. Method of supplying a normally continuous operating hydraulic actuator with hydraulic fluid, continuously and by controlled pulse, and a device for implementing said method. 4,590,763, Cl. 60-327.000.

Auriol, Daniel: *See—*
Paul, Francois; Monsan, Pierre; and Auriol, Daniel, 4,591,563, Cl. 435-193.000.

AURORA Konrad G. Schulz GmbH & Co.: *See—*
Krey, Walter, 4,591,153, Cl. 237-12.30R.

Aurora Mechatronics Corp.: *See—*
Kuo, Calven, 4,591,703, Cl. 235-145.00R.

Austen, Michael D.: *See—*
Hickin, Charles W. R.; and Austen, Michael D., 4,591,844, Cl. 340-728.000.

Austin, Lindsay E.: *See—*
Willard, Virginia D., 4,592,001, Cl. 364-565.000.

Automotive Products plc: *See—*
Leigh-Monstevens, Keith V., 4,590,765, Cl. 60-585.000.

AVA International Corp.: *See—*
Akkerman, Neil H., 4,591,197, Cl. 294-86.240.

Avnery, Tzvi, to Energy Sciences, Inc. High power window and support structure for electron beam processors. 4,591,756, Cl. 313-420.000.

Axelsson, Carl-Lennart; and Torssell, Krister, to IPS Interproject Service AB. Process of producing pig iron from iron ore concentrate. 4,591,381, Cl. 75-40.000.

Baatz, Wilfried, to FloScan Instrument Co., Inc. Apparatus and method for pulsation damping and flow measurement in liquid fuel system. 4,590,796, Cl. 73-113.000.

Bachmann, Ernst, to Hatebur Umformmaschinen AG. Process and apparatus for producing at least two forgings on a hot-forming press. 4,590,780, Cl. 72-328.000.

Baclagis, Luca, to Ram Elettronica di Baclagis Luca & C. S.n.c. Tension regulator for elastic tape and the like, particularly in sewing machines adapted to attach tape to a workpiece. 4,590,874, Cl. 112-121.260.

Badali, Edward A. Auxiliary electric heating system for internal combustion engine powered vehicles. 4,591,691, Cl. 219-202.000.

Badiali, Roberto: *See—*
Bertoli, Luciano; Badiali, Roberto; and Speranzin, Claudio, 4,590,753, Cl. 57-22.000.

Bagley, Rodney D.; and Herczog, Andrew, to Corning Glass Works. Tubular capacitor and method of making. 4,591,947, Cl. 361-310.000.

Bahr, Jochen: *See—*
Orzikowski, Gunter; Niethammer, Rudolf; and Bahr, Jochen, 4,591,881, Cl. 346-117.00R.

Bailey, Francis V.; and Waskiewicz, John J., to Outboard Marine Corporation. Method and apparatus for determining flow pattern of molten metal casting charge. 4,590,987, Cl. 164-457.000.

Bailey & Wasson Trading Company: *See—*
Neilson, James D., Jr., 4,590,649, Cl. 24-616.000.

Bailis, Jean M.; and Cretien, Georges, to Etudes Techniques-Franche-Comte-Alsace Etfa, Sarl. Jointed pneumatic gripping apparatus. 4,591,138, Cl. 269-32.000.

Baird, Brad D.: *See—*
Baird, James D.; and Baird, Brad D., 4,590,805, Cl. 73-861.870.

Baird Controls, Inc.: *See—*
Baird, James D.; and Baird, Brad D., 4,590,805, Cl. 73-861.870.

Baird Corporation: *See—*
Demers, Donald R.; and Allemand, Charly D., 4,591,267, Cl. 356-316.000.

Baird, James D.; and Baird, Brad D., to Baird Controls, Inc. Ultrasonic impeller flowmeter. 4,590,805, Cl. 73-861.870.

Bakker, Gijsbertus; and Rorije, Gerhardus J., to U.S. Philips Corporation. Color display tube having screen with sharply curved surfaces. 4,591,757, Cl. 313-461.000.

Balian, Basil A.; and Busch, Charles R., to Essex Group, Inc. Method and apparatus for feeding and accumulating ribbon material. 4,591,084, Cl. 226-118.000.

Balken, Jochen; Krude, Werner; and Orain, Michel A., to Uni-Cardan Aktiengesellschaft. Wheel bearing assembly. 4,591,212, Cl. 301-105.00R.

Ban, Masuo, to Shimano Industrial Company Limited. Dragging device for a spinning reel. 4,591,108, Cl. 242-84.50R.

Bando Chemical Industries, Ltd.: *See—*
Tanaka, Yoshiharu, 4,591,532, Cl. 428-493.000.

Banno, Taiichi; Fujimori, Ryo; Takekawa, Hiroshi; and Hijikata, Kazuo, to Olympus Optical Co., Ltd. Liquid distributing device for use in chemical analyzer. 4,591,568, Cl. 436-180.000.

Bar-Nefy, Simcha; and Tiomkin, Michael, to Israel Aircraft Industries, Ltd. Mine-field clearing apparatus. 4,590,844, Cl. 89-1.130.

Barabas, John, to Castro Convertibles Corporation. Tri-fold mechanism. 4,590,630, Cl. 5-13.000.

Barbee, Jesse J. Garden tillers. 4,591,001, Cl. 172-43.000.

Barlo, Thomas J.: *See—*
Birchmeier, John R.; Ruck, George T.; Thompson, Neil G.; and Barlo, Thomas J., 4,591,792, Cl. 324-425.000.

Baroffio, Romano: *See—*
Nistri, Ugo; Baroffio, Romano; and Colombo, Paolo, 4,591,450, Cl. 252-135.000.

Barth, Edward G.; Braude, Ruvim; and Kay, Nicholas W., to Burroughs Corporation. Gas plasma display panel containing an improved low-temperature dielectric. 4,591,758, Cl. 313-518.000.

Barth, Wayne E., to Pfizer Inc. Intermediates for 6-(aminoacyloxymethyl) penicillanic acid 1,1-dioxides. 4,591,459, Cl. 260-245.20R.

Bartoli, Francesco: *See—*
Marconi, Walter; Bartoli, Francesco; Morisi, Franco; and Pittalis, Francesco, 4,591,596, Cl. 514-375.000.

Barton, Charles E.: *See—*
Hargett, Hoke S.; Barton, Charles E.; and Boles, William D., 4,591,226, Cl. 339-117.00R.

Batz, Hans-Georg: *See—*
Deneke, Ulfert; Gruber, Wolfgang; and Batz, Hans-Georg, 4,591,553, Cl. 435-16.000.

Bauer, Claude J.; Dellinger, Vernon D.; and Leep, Oral F., to Challenger Electrical Marterials, Inc. Cable clamp attachment for electrical outlet boxes or the like. 4,591,658, Cl. 174-65.00R.

Baumann, Arthur, to Mettler Instrumente AG. Balance with clock-like display. 4,591,011, Cl. 177-122.000.

Baumann, John A.: *See—*
Michel, Christian G.; Marek, Henry S.; and Baumann, John A., 4,591,408, Cl. 156-605.000.

Baumeister, Hans-Peter, to Eastman Kodak Company. Signal processing for high resolution electronic still camera. 4,591,930, Cl. 360-35.100.

Baumeister, Hans-Peter, to Eastman Kodak Company. Playback apparatus. 4,591,931, Cl. 360-72.100.

Bayer Aktiengesellschaft: *See—*
Herd, Karl J.; and Nickel, Horst, 4,591,634, Cl. 534-570.000.
Jager, Horst, 4,591,643, Cl. 544-76.000.
Wust, Alfredo, 4,591,647, Cl. 548-157.000.

Bayerische Motoren Werke AG: *See—*
Kolitsch, Jorg; and Miehle, August, 4,591,784, Cl. 324-208.000.
Matschinsky, Wolfgang, 4,591,184, Cl. 280-666.000.
Steinberg, Klaus, 4,591,137, Cl. 267-182.000.

BBC Brown, Boveri & Company Ltd.: *See—*
Czech, Franz; and Floessel, Carl D., 4,591,655, Cl. 174-22.00C.
Mastner, Georg, 4,591,783, Cl. 324-126.000.
Pinnekamp, Friedrich, 4,591,680, Cl. 200-146.00R.

Beardmore, John M., to General Motors Corporation. Noise isolation for a fuel system. 4,590,964, Cl. 137-565.000.

Beattie, Joanne L.; and Cole, William M., to Firestone Tire & Rubber Company, The. Separation of guayule rubber/resin extract from guayule bagasse by water addition post-extraction. 4,591,631, Cl. 528-930.000.

Beaubatie, Jean; Cavarec, Francois; Lenclos, Jean-Francois; and Paris, Marc, to Commissariat a l'Energie Atomique; and Framatome & Cie. Thermal system for measuring liquid levels. 4,590,797, Cl. 73-295.000.

Beck, Gregory M. Lamp control. 4,591,765, Cl. 315-361.000.

Beck, Patricia A., to AT&T Bell Laboratories. Forming an ordered array for visual inspection. 4,591,392, Cl. 134-25.400.

Becker, Reinhard: *See—*
Urbach, Hansjorg; Henning, Rainer; and Becker, Reinhard, 4,591,598, Cl. 514-412.000.

Beckerman, Howard L. Arrangement for controlling the speed of a DC motor. 4,591,769, Cl. 318-331.000.

Beckner, Mark W., Davis, James A.; Gausmann, Eric J.; Hiller, Thomas L.; Olson, Philip D.; and Van Dine, Gilbert A., to AT&T Bell Laboratories. Integrated packet switching and circuit switching system. 4,592,048, Cl. 370-60.000.

Becton Dickinson & Company: *See—*
Wagner, Daniel B.; and Dasher, Luther W., 4,591,569, Cl. 436-500.000.

Behringer, Jurgen; Pluciniczak, Hans-Friedrich; Syllwasschy, Wolfgang; and Loley, Franz, to Stahlwerke Bochum AG. Sheet for laminated iron cores including woven or non-woven fabrics. 4,591,529, Cl. 428-252.000.

Beier, Sybille: *See—*
Kerb, Ulrich; Sauer, Gerhard; Wiechert, Rudolf; Henderson, David; Nishino, Yukishige; and Beier, Sybille, 4,591,585, Cl. 514-177.000.

Beining, August H.: *See*—
Komadina, Bruce M.; Lazarevich, Vladeta D.; and Beining, August H., 4,591,710, Cl. 250-221.000.

Bell & Howell Company: *See*—
Jacobs, John H., 4,591,938, Cl. 360-137.000.

Bellehumeur, Lucien J. Picture hanging device. 4,591,125, Cl. 248-476.000.

Belmont Textile Machinery Company: *See*—
Niederer, Kurt W., 4,591,105, Cl. 242-18.00A.

Belotserkovsky, Isaac M.; and Hollinden, David E., to RCA Corporation. Peaking circuit for video driver stage. 4,591,912, Cl. 358-166.000.

Ben-Aharon, Zvi: *See*—
Regan, Robert J.; Butler, Scott J.; and Ben-Aharon, Zvi, 4,591,809, Cl. 331-117.00R.

Benedetto, Joseph A.; and Shepherd, Neal H., to Benedetto, Joseph A. Portable cordless telephone transceiver-radio receiver. 4,591,661, Cl. 179-2.0EA.

Beneteau, Christian, to Champion Spark Plug Europe S.A. Wiper blade with air deflecting device. 4,590,638, Cl. 15-250.420.

Bennett, James S.; and Lark, Jay S., to Teknowledge, Inc. Hierarchical knowledge system. 4,591,983, Cl. 364-403.000.

Bennett, John S., to Massey-Ferguson Inc. Gear selector means. 4,590,817, Cl. 74-473.00R.

Bensadon, Joseph M., to International Business Machines Corporation. Apparatus and method for providing a transparent interface across a satellite communications link. 4,592,050, Cl. 370-103.000.

Beranger, Herve ; Brunin, Armand; and Rousseau, Jean-Paul, to International Business Machines Corporation. Latch for storing a data bit and a store incorporating said latch. 4,592,023, Cl. 365-189.000.

Berchem, Rutger, to Berchem & Schbaerg GmbH. Method of making a composite forged-metal article. 4,591,089, Cl. 228-167.000.

Berchem & Schbaerg GmbH: *See*—
Berchem, Rutger, 4,591,089, Cl. 228-167.000.

Berg, Bernard J.: *See*—
Peterson, Steven H.; Berg, Bernard J.; and Bowden, David R., 4,591,978, Cl. 364-200.000.

Berg, Jeremy R.; Loveless, John G.; and Senkow, Walter. Wood panel earth shelter construction. 4,590,721, Cl. 52-169.100.

Bergen, Richard F.: *See*—
Gundlach, Robert W.; and Bergen, Richard F., 4,591,713, Cl. 250-326.000.

Bergler, Otto, to Black & Decker Overseas AG. Milling fixture with a manual top spindle molder. 4,591,305, Cl. 409-175.000.

Bergstrom, Christer, to Neste Oy. Polyolefin foam foamed with water and cross-linked with silane, and procedure for its manufacturing. 4,591,606, Cl. 521-79.000.

Berkowitz, Barry J.: *See*—
Kane, Russell D.; Greer, James B.; Jacobs, Dawn F.; and Berkowitz, Barry J., 4,591,393, Cl. 148-11.50N.

Bernard, Jerald D.; and Koltookian, Sarkis A., to Deere & Company. Valve seal breakaway device. 4,591,129, Cl. 251-64.000.

Berney, Sheldon, to Reliance Products Ltd. Base for supporting an upright post of a garden umbrella or the like. 4,591,126, Cl. 248-524.000.

Bernhardt Industries: *See*—
Vickers, Timothy J.; and Lloyd, Darrell W., 4,591,289, Cl. 403-322.000.

Bernstein, Larry H. Malate dehydrogenase method. 4,591,555, Cl. 435-26.000.

Bernstein, Seymour: *See*—
Conrow, Ransom B.; and Bernstein, Seymour, 4,591,604, Cl. 514-577.000.

Berta, Dominic A., to Hercules Incorporated. Crosslinking composition for butyl rubber or halobutyl rubber and epihalohydrin rubber blends. 4,591,617, Cl. 525-187.000.

Bertoli, Luciano; Badiali, Roberto; and Speranzin, Claudio, to Officine Savio S.p.A. Procedure for the mechanical splicing of textile yarns. 4,590,753, Cl. 57-22.000.

Besnard, Francois: *See*—
Fournie, Rene ; and Besnard, Francois, 4,591,191, Cl. 285-18.000.

Bethea Electrical Products, Inc.: *See*—
Smith, Karl E.; and Lin, Wei-Chung, 4,591,130, Cl. 254-134.3PA.

Bettcher Industries, Inc.: *See*—
Bettcher, Louis A., 4,590,676, Cl. 30-276.000.

Bettcher, Louis A., to Bettcher Industries, Inc. Boning and trimming knife and housing. 4,590,676, Cl. 30-276.000.

Bevelacqua, Joseph. Unique improved drainage system for basements. 4,590,722, Cl. 52-169.500.

Bhend, Richard B.: *See*—
Gaebelein, Georg, deceased; Bhend, Richard B.; Keillor, Robert D.; Lovgren, Jeffrey L.; and Mercer, John R., 4,591,727, Cl. 250-578.000.

Bialas, John S., Jr.; Daniels, Richard J.; and Mruk, William J., to International Business Machines Corporation. Charge pumping circuit. 4,591,738, Cl. 307-296.00R.

Bianchi Intl. Inc.: *See*—
Bianchi, John E.; and Nichols, Richard D. E., 4,591,081, Cl. 224-192.000.

Bianchi, John E.; and Nichols, Richard D. E., to Bianchi Intl. Inc. Ambidextrous holster. 4,591,081, Cl. 224-192.000.

Bickel, Hans: *See*—
Scartazzini, Riccardo; and Bickel, Hans, 4,591,642, Cl. 544-16.000.

Biddlecombe, William H.; Elder, Hugh Y.; and Nicholson, W. A. Patrick, to University of Glasgow, The University Court of the. Low temperature stage for microanalysis. 4,591,722, Cl. 250-443.100.

Bigotte, Georges. Container cap with self-retracting spout. 4,591,079, Cl. 222-538.000.

Bio-Environmental Systems, Inc.: *See*—
Smith, William B., 4,591,566, Cl. 435-291.000.

Bio Image Corporation: *See*—
Hartman, John R., 4,592,089, Cl. 382-6.000.

Bioetica, S.A.: *See*—
Huc, Alain; Gimeno, Rene; and Herbage, Daniel, 4,591,456, Cl. 530-356.000.

Biogal Gyogyszergyar: *See*—
Kovacs, Antal; Erdei, Janos; Kovats, Karoly; Polya, Laszlo ; Pasztor, Karoly; Nagy, Janos; Pepo , Pal; Pepo , Peter; Kiss, Gyorgy; and Kajati, Istvan, 4,591,379, Cl. 71-94.000.

Biomed Concepts, Inc.: *See*—
Loeb, Gerald E., 4,590,946, Cl. 128-642.000.

Biosonics, Inc.: *See*—
Brenman, Henry S.; Schwartz, Harold L.; and Katz, Philip, 4,590,942, Cl. 128-419.00R.

Birchmeier, John R.; Ruck, George T.; Thompson, Neil G.; and Barlo, Thomas J., to Gas Research Institute. Method and apparatus for measuring the polarized potential of a buried or submerged structure protected by impressed current. 4,591,792, Cl. 324-425.000.

Birkbeck College: *See*—
Hedgley, Edward J., 4,591,061, Cl. 215-12.00R.

Black & Decker Inc.: *See*—
Pelfrey, Keith A., 4,591,301, Cl. 408-76.000.

Black & Decker Overseas AG: *See*—
Bergler, Otto, 4,591,305, Cl. 409-175.000.

Blackburn, Tom L., to GTE Communication Products Corporation. Apparatus for controlling a plurality of current sources. 4,591,855, Cl. 340-870.130.

Blaha, J. David: *See*—
Kurth, Lloyd A.; and Blaha, J. David, 4,590,930, Cl. 128-92.0BC.

Blendick, Leonard E., to Minialoff, Edward P. Panel and gutter assembly. 4,590,730, Cl. 52-461.000.

Blight, Marshall R., to Emeraldine Limited. Boomerang. 4,591,164, Cl. 273-425.000.

Blizzard, Cyril A. M., to Pratt & Whitney Canada Inc. Method and apparatus for improving acceleration in a multi-shaft gas turbine engine. 4,590,759, Cl. 60-39.030.

Blizzard, John D.; and Swihart, Terence J., to Dow Corning Corporation. Silicone pressure-sensitive adhesive process and product thereof. 4,591,622, Cl. 525-477.000.

Block, Alvin. Automatic interlock connector arrangement for radio-controlled model airplanes. 4,591,114, Cl. 244-120.000.

Block, Harvey P., to U.S. Highway Products, Inc. Snow plow with bar reinforced deformable blade. 4,590,694, Cl. 37-233.000.

Bloom, Phillip J.; and Marshall, Garth D., to Wordfit Limited. Method and apparatus for use in processing signals. 4,591,928, Cl. 360-13.000.

Bloom, Robert D.; Burke, Edward J.; and Kozol, Eugene T., to International Business Machines Corporation. Microprocessor-controlled positioning system. 4,591,969, Cl. 364-183.000.

Blossom, Carolyn S. Combination purse-coupon organizer device, methods of constructing and utilizing same. 4,591,054, Cl. 206-425.000.

Blue Bell, Inc.: *See*—
Kitchman, Fern E., 4,590,623, Cl. 2-85.000.

Board of Regents acting on behalf of University of Michigan: *See*—
Morris, Michael D.; and Chen, Tsuey I., 4,591,272, Cl. 356-432.000.

Board of Regents, University of Texas System: *See*—
Bostick, Francis X., Jr., 4,591,791, Cl. 324-350.000.

Bobby-Mac Company, Inc.: *See*—
McDonald, Quentin H.; Panicci, Richard L.; and Nowak, Ralph M., 4,591,208, Cl. 297-487.000.

BOC Group, plc, The: *See*—
Moore, Colin, 4,591,331, Cl. 431-16.000.

Bocker, Richard P.; Clayton, Stanley R.; and Bromley, Keith, to United States of America, Navy. Electrooptical matrix multiplication using the twos complement arithmetic for improved accuracy. 4,592,004, Cl. 364-713.000.

Boden, Richard M.: *See*—
Mookherjee, Braja D.; Trenkle, Robert W.; Wolff, Robin K.; Boden, Richard M.; and Yoshida, Takao, 4,591,451, Cl. 252-522.00R.

Bodor, Janos; Heslinga, Lammert; van Heteren, Jan; and de Vries, Bartholomeus, to Lever Brothers Company. Edible water-in-oil emulsion spreads containing hydrated starch particles dispersed in the aqueous phase. 4,591,507, Cl. 426-604.000.

Boeckmann, Eduard F. B., to GTE Business Communication Systems Inc. Protection circuitry for subscriber's telephone circuit equipped with repertory memory. 4,591,666, Cl. 179-90.00B.

Boehringer Mannheim GmbH: *See*—
Deneke, Ulfert; Gruber, Wolfgang; and Batz, Hans-Georg, 4,591,553, Cl. 435-16.000.

Boeing Company, The: *See*—
Hinger, Gary W.; and Crial, Richard S., 4,591,685, Cl. 219-74.000.
Miyatake, Henry J.; and Sakurai, Seiya, 4,591,313, Cl. 416-155.000.
Williams, John W., 4,590,634, Cl. 14-71.100.

Boen, Per, to A/S Sonnichsen Rorvalseverket. Extruder and calibrating apparatus for making ribbed or grooved pipe. 4,591,323, Cl. 425-97.000.

Bohlen, Harald; Bretscher, Erwin; Engelke, Helmut; Nehmiz, Peter; Vettiger, Peter; and Greschner, Johann, to International Business

Machines Corporation. Method of transferring a pattern into a radiation-sensitive layer. 4,591,540, Cl. 430-22.000.

Boles, William D.: *See—*
Hargett, Hoke S.; Barton, Charles E.; and Boles, William D., 4,591,226, Cl. 339-117.00R.

Bonadio, George A. H. Oral ingestion of indium. 4,591,506, Cl. 424-131.000.

Bonaschi, Antonio, to Comez S.p.A. Control device for the selection of weft yarns in a weaving machine. 4,590,776, Cl. 66-205.000.

Bonnemay, Alain, to Commissariat a l'Energie Atomique. Apparatus for measuring the level of a liquid in an enclosure. 4,591,719, Cl. 250-357.100.

Bopp, Warren G., to Eaton Corporation. Rotary magnetic control for a viscous fluid coupling. 4,591,037, Cl. 192-58.00B.

Borg-Warner Corporation: *See—*
Shaffer, Jacob E.; Dellinger, Wayne D.; and Harnish, James R., 4,590,771, Cl. 62-156.000.

Boster, Eugene M.: *See—*
Mortvedt, Eugene S.; and Boster, Eugene M., 4,591,178, Cl. 280-154.000.

Bostick, Francis X., Jr., to Board of Regents, University of Texas System. Electromagnetic array profiling survey method. 4,591,791, Cl. 324-350.000.

Bouffard, Jean; Dumoulin, Andre ; and Seguin, Marc, to Northern Telecom Limited. Forming cable core units. 4,590,754, Cl. 57-58.550.

Bounds, William E. Condiment mill. 4,591,104, Cl. 241-169.100.

Bowden, David R.: *See—*
Peterson, Steven H.; Berg, Bernard J.; and Bowden, David R., 4,591,978, Cl. 364-200.000.

Bowersox, Donald J.: *See—*
Dornbush, Donald H.; and Bowersox, Donald J., 4,591,974, Cl. 364-200.000.

Bozarth, Theodore B., Jr.; Olsen, Arthur M.; and Rowlands, Ronald H., to Honeywell Inc. Method of digital temperature compensation and a digital data handling system utilizing the same. 4,592,002, Cl. 364-571.000.

Brackett, Douglas C. Device for converting between rotary and rectilinear motion. 4,590,812, Cl. 74-55.000.

Bracon, Roland: *See—*
Aubert, Jean P.; Bracon, Roland; and Ravasy, Bernard, 4,590,752, Cl. 57-9.000.

Bradley, John P., to International Business Machines Corporation. Drive mechanism for a ribbon disc. 4,591,282, Cl. 400-144.200.

Bradshaw, David C.; Robinson, William C.; and Rossi, James R., to Standard Oil Company (Indiana). Precorrelation filtering. 4,592,031, Cl. 367-45.000.

Bradshaw, Thomas H.; Golledge, Ian; and Pike, John V., to International Business Machines Corporation. Adjustable brake assembly. 4,591,123, Cl. 248-349.000.

Brandenstein, Manfred: *See—*
Olschewski, Armin; Brandenstein, Manfred; Walter, Lothar; and Ernst, Horst M., 4,591,352, Cl. 474-95.000.

Branner-Jorgensen, Sven; Schneider, Palle; and Eigtved, Peter, to Novo Industri A/S. Method for thermal destabilization of microbial rennet. 4,591,565, Cl. 435-223.000.

Brashear, Robert L. Portable horse stocks. 4,590,886, Cl. 119-27.000.

Braude, Ruvim: *See—*
Barth, Edward G.; Braude, Ruvim; and Kay, Nicholas W., 4,591,758, Cl. 313-518.000.

Braun, Hilarion; Brown, Mark E.; and Piatt, Michael J., to Eastman Kodak Company. Ink jet printing apparatus and method with condensate-washing for print head. 4,591,870, Cl. 346-1.100.

Braun, Leon, to Sebrn Corporation. Method of interfacing peripheral devices with a central processor. 4,592,012, Cl. 364-900.000.

Bray, Murel B. Automatic label emplacer and dispenser for sewing machines. 4,590,872, Cl. 112-121.120.

Brenman, Henry S.; Schwartz, Harold L.; and Katz, Philip, to Biosonics, Inc. Apparatus and method for inhibiting nasal secretions. 4,590,942, Cl. 128-419.00R.

Bretscher, Erwin: *See—*
Bohlen, Harald; Bretscher, Erwin; Engelke, Helmut; Nehmiz, Peter; Vettiger, Peter; and Greschner, Johann, 4,591,540, Cl. 430-22.000.

Bricheno, Terry; Fielding, Alan; and Hewish, Nicholas A., to Standard Telephones & Cables Public Ltd. Co. Single mode fibre directional coupler manufacture. 4,591,372, Cl. 65-4.200.

Bridgestone Cycle Co., Ltd.: *See—*
Takamiya, Kikuzo; and Tamura, Yoshitaka, 4,591,027, Cl. 188-24.110.

Bridgestone Tire Co., Ltd.: *See—*
Naito, Kazuo; Fuse, Tadashi; Tanuma, Itsuo; Fukuura, Yukio; and Ishikawa, Hikaru, 4,591,618, Cl. 525-279.000.

Bright, John T.: *See—*
Murray, Clarence L.; and Bright, John T., 4,591,466, Cl. 264-35.000.

Bringhurst, Edward D., to Mannesmann Tally Corporation. Permanent magnet, stored energy, print head. 4,591,280, Cl. 400-124.000.

Bristol-Myers Company: *See—*
Hoshi, Hideaki; Okumura, Jun; Naito, Takayuki; Abe, Yoshio; and Aburaki, Shimpei, 4,591,641, Cl. 544-16.000.

British Aerospace Public Limited Company: *See—*
Scott, Peter R., 4,591,117, Cl. 244-170.000.

British-American Tobacco Company Limited: *See—*
Bryant, Robert G. W., 4,591,073, Cl. 222-55.000.

British Gas Corporation: *See—*
Brown, Robert C.; and McIntyre, John D., 4,590,799, Cl. 73-432.00R.

British Petroleum Company p.l.c., The: *See—*
Aldred, Alan C. G.; and Fogg, Sidney G., 4,591,615, Cl. 525-179.000.
Fogg, Sidney G.; and Robertson, Frank C., 4,591,620, Cl. 525-328.800.

Britt, Kenneth R.: *See—*
Jones, William C.; Britt, Kenneth R.; and Newell, Isaac L., 4,591,397, Cl. 148-15.500.

Britten, Roy J.; and Davidson, Eric H., to California Institute of Technology. Recombinant DNA screening system including fixed array replicator and support. 4,591,567, Cl. 435-293.000.

Broadhurst, Michael J.; Hassall, Cedric H.; and Thomas, Gareth J., to Hoffmann-La Roche Inc. Anthracycline glycosides. 4,591,636, Cl. 536-6.400.

Brod, Meyer C. Recording lock system. 4,591,852, Cl. 340-825.310.

Brodbeck, Howard D.: *See—*
Wieland, Rolf H.; Brodbeck, Howard D.; Paston, Alan J.; and Maucere, Casper C., 4,590,656, Cl. 29-450.000.

Brodie, George W., to IMI Marston Limited. Pressure relief disc. 4,591,520, Cl. 428-64.000.

Brodin, Ralph. Hydraulic stroke control for radial arm saws. 4,590,831, Cl. 83-56.000.

Bromley, Keith: *See—*
Bocker, Richard P.; Clayton, Stanley R.; and Bromley, Keith, 4,592,004, Cl. 364-713.000.

Broockman, Eric C.; and Fortenberry, Robert S., to International Business Machines Corporation. Optical scanner with beam directing holograms at window. 4,591,236, Cl. 350-3.710.

Broockman, Eric C.; Cato, Robert T.; and Dickson, LeRoy D., to International Business Machines Corp. Optical scanner having multiple, simultaneous scan lines with different focal lengths. 4,591,242, Cl. 350-3.710.

Brooks, Edward F., to TRW Inc. Fluidization aid. 4,591,334, Cl. 432-15.000.

Broome, Mark W.; and McKemie, George R., to Rome Industries, Inc. Offset harrow. 4,591,003, Cl. 172-597.000.

Brother Kogyo Kabushiki Kaisha: *See—*
Kawaguchi, Hideo; Ando, Hideo; and Watanabe, Yasuhiko, 4,590,870, Cl. 112-70.000.

Brown, Boveri & Cie Aktiengesellschaft: *See—*
Neidig, Arno; Bunk, Klaus; Thiele, Karl-Heinz; Wahl, Georg; and Gobrecht, Jens, 4,591,401, Cl. 156-89.000.

Brown, David C., to Kollmorgen Technologies Corp. Video rangefinder. 4,591,987, Cl. 364-458.000.

Brown, Dennis: *See—*
Upton, Gene; and Brown, Dennis, 4,591,175, Cl. 280-33.99C.

Brown, James H.: *See—*
De Villez, Richard L., 4,591,602, Cl. 514-463.000.

Brown, Mark E.: *See—*
Braun, Hilarion; Brown, Mark E.; and Piatt, Michael J., 4,591,870, Cl. 346-1.100.

Brown, Peter A.: *See—*
Charlebois, Leonard J.; and Brown, Peter A., 4,591,330, Cl. 425-567.000.

Brown, Richard A.; and Norris, Robert D., to FMC Corporation. Method for decontaminating a permeable subterranean formation. 4,591,443, Cl. 210-747.000.

Brown, Richard L.; Anderson, Daniel J.; and Lickus, Leonard J., to Molex Incorporated. Electrical harness fabrication machine. 4,590,650, Cl. 29-33.00M.

Brown, Robert C.; and McIntyre, John D., to British Gas Corporation. Pipeline pig tracking. 4,590,799, Cl. 73-432.00R.

Brown, Ronald: *See—*
Summers, Frank V.; Meissner, David C.; and Brown, Ronald, 4,591,380, Cl. 75-35.000.

Brown, Ronald D.; and Waters, James D., Jr., to Caterpillar Tractor Co. Adaptive welding guidance apparatus. 4,591,689, Cl. 219-124.340.

Brown, Tom: *See—*
Jones, John H.; and Brown, Tom, 4,591,648, Cl. 548-344.000.

Brownell, Terry, to General Instrument Corporation. Dual layer positive photoresist process and devices. 4,591,547, Cl. 430-312.000.

Browning, James R.; and Carlo, Louis D., to Mr. Gasket Company. Lockable central nut for vehicle wheel mounting. 4,591,211, Cl. 301-9.00G.

Brull, Maurice A., to Tensiodyne Scientific Corporation. Device for monitoring fatigue life and method of making the same. 4,590,804, Cl. 73-762.000.

Brunin, Armand: *See—*
Beranger, Herve ; Brunin, Armand; and Rousseau, Jean-Paul, 4,592,023, Cl. 365-189.000.

Brunner, Rudolf, to Heilmeier & Weinlein Fabrik fur Oel-Hydraulik GmbH & Co. KG. Two-position switching valve having hydraulic self-holding properties. 4,590,958, Cl. 137-115.000.

Brunswick Corp.: *See—*
Hundertmark, James M., 4,590,897, Cl. 123-73.00A.

Bryant, Jack A. System for amplifying all frequencies detected from a flame detector. 4,591,725, Cl. 250-554.000.

Bryant-Jeffries, Keith C.; Golledge, Ian; Pike, John V.; and Vaughan, Eric V., to International Business Machines Corporation. Tiltable and/or rotatable support for display device. 4,591,120, Cl. 248-179.000.

Bryant, Robert G. W., to British-American Tobacco Company Limited. Apparatus for monitoring particulate material. 4,591,073, Cl. 222-55.000.

Buchanan, Michael S.; and Davis, Gregory B., to Wm. T. Burnett & Co., Inc. Process for making foam-in-form polyurethane foam buns and apparatus therefor. 4,591,469, Cl. 264-45.300.

Bucklen, Willard K., to TRW Inc. Analog-to-digital-converter and related encoding technique. 4,591,825, Cl. 340-347.0AD.

Budzich, Tadeusz, to Fluid Power Components, Inc. Automatic controls of water-oil separating system for use with centrifugal type separator. 4,591,433, Cl. 210-114.000.

Buente, Stephen M.; and Mihalic, William T., to Eaton Corporation. Hydraulic tappet for direct-acting valve gear. 4,590,898, Cl. 123-90.550.

Bugiel, Horst G., to Diehl GmbH & Co. Insert for a projectile-forming charge. 4,590,861, Cl. 102-501.000.

Bujack, Kurt W.: *See—*
Hanchett, Michael T.; Stone, Patrick B.; Bujack, Kurt W.; and Strand, Monte S., 4,590,680, Cl. 33-366.000.

Bunk, Klaus: *See—*
Neidig, Arno; Bunk, Klaus; Thiele, Karl-Heinz; Wahl, Georg; and Gobrecht, Jens, 4,591,401, Cl. 156-89.000.

Buonomo, Joseph P.; Houghtalen, Steven R.; Losinger, Raymond E.; and Valashinas, James W., to International Business Machines Corporation. Storage selection override apparatus for a multimicroprocessor implemented data processing system. 4,591,982, Cl. 364-200.000.

Burger, Norman J.: *See—*
Goldfarb, Adolph E.; Everitt, Delmar K.; and Burger, Norman J., 4,591,347, Cl. 446-462.000.

Burk, Gerhard; and Mordau, Manfred, to Daimler-Benz Aktiengesellschaft. Front assembly for motor vehicles. 4,591,202, Cl. 296-194.000.

Burke, Edward J.: *See—*
Bloom, Robert D.; Burke, Edward J.; and Kozol, Eugene T., 4,591,969, Cl. 364-183.000.

Burke, Timothy M.: *See—*
Noble, Scott W.; Burke, Timothy M.; and Lynk, Charles N., Jr., 4,591,851, Cl. 340-825.070.

Burmenko, Mark: *See—*
Katsman, Ilya; Ritchie, John A.; Burmenko, Mark; and Zaltsman, Vladimir, 4,590,709, Cl. 49-396.000.

Burr-Brown Corporation: *See—*
Anderson, Thomas R.; Skolnik, Howard L.; and Trump, Bruce C., 4,591,740, Cl. 307-310.000.

Burr, Peter S., to Linde Aktiengesellschaft. Semipermeable membrane gas separation system. 4,591,365, Cl. 55-16.000.

Burroughs Corporation: *See—*
Barth, Edward G.; Braude, Ruvim; and Kay, Nicholas W., 4,591,758, Cl. 313-518.000.
Koos, William M., Jr.; Geis, Timothy R.; and Rudy, Richard M., Jr., 4,591,846, Cl. 340-748.000.
Wentzel, Robert J.; and Tallman, Walter E., 4,591,141, Cl. 271-127.000.

Busch, Charles R.: *See—*
Balian, Basil A.; and Busch, Charles R., 4,591,084, Cl. 226-118.000.

Buser, Rudolf G.: *See—*
Koechner, Walter; and Buser, Rudolf G., 4,591,709, Cl. 250-221.000.

Bush, Richard W.: *See—*
Kang, Uan G.; Bush, Richard W.; Ketley, Arthur D.; and Ferrin, Clifford A., Jr., 4,591,522, Cl. 428-419.000.

Butler Manufacturing Company: *See—*
Mohr, Gregory L., 4,591,656, Cl. 174-48.000.

Butler, Scott J.: *See—*
Regan, Robert J.; Butler, Scott J.; and Ben-Aharon, Zvi, 4,591,809, Cl. 331-117.00R.

Butson, Peter C., to Picker International Limited. Coil arrangement for generating a high frequency magnetic field. 4,591,818, Cl. 335-299.000.

Buxel, Ludwig M.; Muhlhaus, Ludwig; and Neumann, Ulrich, to Uhde GmbH. Process for reheating and conveying a granular heat carrier. 4,591,335, Cl. 432-15.000.

Byers, Donald W. Method and apparatus for coating detection and surface evaluation. 4,591,271, Cl. 356-432.000.

Byers, Stuart D., to Crophandling Systems Limited. Plastic insert for storage vessel. 4,591,067, Cl. 220-81.00R.

C. A. Weidmuller GmbH & Co.: *See—*
Wiener, Hans; and Undin, Hans, 4,590,786, Cl. 72-410.000.

C-I-L: *See—*
Cameron, Gordon M.; and Lyne, Edward G. C., 4,591,494, Cl. 423-522.000.

C-I-L Inc.: *See—*
Cameron, Gordon M., 4,591,495, Cl. 423-522.000.

Caers, Ludo M. J.: *See—*
De Brouckere, Lucien C.; Caers, Ludo M. J.; and Verbert, Karel H., 4,591,221, Cl. 339-19.000.

Calbee Foods Co., Ltd.: *See—*
Matsuo, Takashi, 4,590,835, Cl. 83-698.000.

Calhoun, Gregory L.: *See—*
Cooper, Frank W., Jr.; Epperson, Thomas M.; Calhoun, Gregory L.; and Kucherer, Harvey D., 4,590,991, Cl. 165-69.000.

California Institute of Technology: *See—*
Britten, Roy J.; and Davidson, Eric H., 4,591,567, Cl. 435-293.000.

Callaway Hickory Stick-USA, Inc.: *See—*
Parente, Richard E.; and De LaCruz, Richard, 4,591,157, Cl. 273-80.00B.

Cambridge Consultants Limited: *See—*
Storey, Michael J., 4,591,828, Cl. 340-347.0DA.

Cameron, Gordon M.; and Lyne, Edward G. C., to C-I-L. Method and apparatus for making sulphuric acid. 4,591,494, Cl. 423-522.000.

Cameron, Gordon M., to C-I-L Inc. Method and apparatus for making sulphuric acid. 4,591,495, Cl. 423-522.000.

Campbell, David L., to Advanced Micro Devices, Inc. Master-slave multivibrator with improved metastable response characteristic. 4,591,737, Cl. 307-272.00A.

Campbell, Gregory A.; and Seefried, Carl G., Jr., to Mobil Oil Corporation. Graft copolymers of para-methylstyrene on polyols and polyurethanes prepared therefrom. 4,591,607, Cl. 521-137.000.

Campbell, Jay E.; Reichmann, Richard H.; and Li, Lehmann K., to American Cyanamid Company. Surgical stapling instrument. 4,591,086, Cl. 227-19.000.

Campbell, Richard A., to Raytheon Company. Radar transmitter. 4,591,859, Cl. 343-5.0AF.

Campodonico, Salvatore I., to Allen-Stevens Corp. Arrangement for tiltably mounting a window sash. 4,590,708, Cl. 49-181.000.

Canadian Security Printers Inc.: *See—*
Clark, Fred C., 4,591,190, Cl. 283-102.000.

Canal, Yves S., to U.S. Philips Corporation. Thin-structure dual directional antenna for high frequencies. 4,591,865, Cl. 343-767.000.

Canon Kabushiki Kaisha: *See—*
Hashimoto, Seiji, 4,591,899, Cl. 358-41.000.
Kaneda, Naoya; Toyama, Masamichi; Kozuki, Susumu; Kohtani, Yutaka; and Fujiwara, Akihiro, 4,591,919, Cl. 358-227.000.
Kawamura, Naoto; and Kitajima, Nobuo, 4,591,903, Cl. 358-75.000.
Masaki, Yuichi; and Hotta, Yoshio, 4,591,240, Cl. 350-339.00R.
Matsumura, Susumu, 4,591,256, Cl. 354-402.000.
Miyamoto, Koichi; Takahashi, Yuji; and Kikuchi, Yutaka, 4,591,884, Cl. 346-153.100.
Nakajima, Toshifumi, 4,591,921, Cl. 358-257.000.
Nishino, Fumio; Onoda, Shigeyoshi; Nomura, Akihiro; Mizutani, Morikazu; Kanemitsu, Shinji; and Toriumi, Mototada, 4,591,258, Cl. 355-3.00R.
Nozaki, Mineo; Asakura, Osamu; Nagashima, Masasumi; and Uchikata, Yoshio, 4,591,876, Cl. 346-76.0PH.
Takeda, Takashi, 4,591,829, Cl. 340-347.0DD.

Caporiccio, Gerardo; and Strepparola, Ezio, to Montedison S.p.A. Process for exhaustively decontaminating perfluoropolyethereal oils. 4,591,444, Cl. 210-748.000.

Carb-A-Drink International, Inc.: *See—*
Mathews, Robert B., 4,590,974, Cl. 141-1.000.

Carbol, Paul: *See—*
Ernryd, Leif W.; Carbol, Vlastimil; and Carbol, Paul, 4,591,437, Cl. 210-265.000.

Carbol, Vlastimil: *See—*
Ernryd, Leif W.; Carbol, Vlastimil; and Carbol, Paul, 4,591,437, Cl. 210-265.000.

Carl Freudenberg, Firma: *See—*
Holzer, Helmut, 4,591,168, Cl. 277-134.000.

Carlo, Louis D.: *See—*
Browning, James R.; and Carlo, Louis D., 4,591,211, Cl. 301-9.00G.

Carpenter, Denis D.: *See—*
Oltman, John E.; Carpenter, Denis D.; and Dopp, Robert B., 4,591,539, Cl. 429-27.000.

Carpenter, Roy B., Jr.; and Drabkin, Mark, to LEA Dynatech Inc. Regulated a.c. power supply. 4,591,779, Cl. 323-301.000.

Caruso, Richard. Hair styling diffuser. 4,590,687, Cl. 34-97.000.

Casagrande, Gianfranco: *See—*
Cazzaro, Giorgio; Cavallaro, Antonino; Casagrande, Gianfranco; and Del Felice, Gianmarco, 4,591,361, Cl. 8-538.000.

Casio Computer Co., Ltd.: *See—*
Kashio, Toshio, 4,590,838, Cl. 84-1.010.

Cass, Michael, to Imperial Chemical Industries PLC. Transparent thermoplastic sheet. 4,591,525, Cl. 428-195.000.

Castro Convertibles Corporation: *See—*
Barabas, John, 4,590,630, Cl. 5-13.000.

Catchpole, Richard J.: *See—*
Jessop, Anthony; Catchpole, Richard J.; Dyke, Peter J.; and Farley, Brian S., 4,592,068, Cl. 375-3.000.

Caterpillar Tractor Co.: *See—*
Brown, Ronald D.; and Waters, James D., Jr., 4,591,689, Cl. 219-124.340.

Cates, Lindley A., to Research Corporation. Organophosphorus compounds useful as anticonvulsant agents. 4,591,582, Cl. 514-114.000.

Cato, Robert T.: *See—*
Broockman, Eric C.; Cato, Robert T.; and Dickson, LeRoy D., 4,591,242, Cl. 350-3.710.

Catros, Jean-Yves, to Thomson-CSF. Method and device for detection of moving points in a television image for digital television systems providing conditional-replenishment bit-rate compression. 4,591,907, Cl. 358-136.000.

Cavallaro, Antonino: *See—*
Cazzaro, Giorgio; Cavallaro, Antonino; Casagrande, Gianfranco; and Del Felice, Gianmarco, 4,591,361, Cl. 8-538.000.

Cavarec, Francois: *See—*
Beaubatie, Jean; Cavarec, Francois; Lenclos, Jean-Francois; and Paris, Marc, 4,590,797, Cl. 73-295.000.

Cazzaro, Giorgio; Cavallaro, Antonino; Casagrande, Gianfranco; and Del Felice, Gianmarco, to Snia Fibre S.p.A. Method of producing acrylonitrile-base in-line dyed fibers using rapidly alternating dye solution cross flow. 4,591,361, Cl. 8-538.000.

Centocor, Inc.: *See—*
Chang, Tse-Wen, 4,591,570, Cl. 436-518.000.

Central Glass Company, Limited: *See*—
Miyata, Seizo; and Kobayashi, Satoru, 4,591,616, Cl. 525-185.000.
Chalek, Carl L.; and Johnson, Peter D., to General Electric Company. Ingredients for solenoidal metal halide arc lamps. 4,591,759, Cl. 313-638.000.
Challenger Electrical Marterials, Inc.: *See*—
Bauer, Claude J.; Dellinger, Vernon D.; and Leep, Oral F., 4,591,658, Cl. 174-65.00R.
Champion Corporation: *See*—
Clapp, James A., Jr., 4,591,309, Cl. 414-546.000.
Champion, Elmer L. Heat exchanger tube strainer. 4,590,994, Cl. 165-119.000.
Champion Spark Plug Europe S.A.: *See*—
Beneteau, Christian, 4,590,638, Cl. 15-250.420.
Chan, Fred N., to Ford Aerospace & Communications Corporation. Hysteresis conditioner for spacecraft attitude control. 4,591,118, Cl. 244-171.000.
Chang, Ching-Sung: *See*—
Lee, Lin-Shan; Chou, Ger-Chih; and Chang, Ching-Sung, 4,591,673, Cl. 179-1.50R.
Chang, Hong-Tsuan. Electric dual and quick cooking utensil. 4,591,698, Cl. 219-400.000.
Chang, Tse-Wen, to Centocor, Inc. Matrix of antibody-coated spots for determination of antigens. 4,591,570, Cl. 436-518.000.
Chao, Chien C.; and Sherman, John D., to Union Carbide Corporation. Separation of arabinose by selective adsorption on zeolitic molecular sieves. 4,591,388, Cl. 127-46.300.
Chapman, Victor B.: *See*—
Curl, Barry J.; and Chapman, Victor B., 4,592,090, Cl. 382-7.000.
Charboneau, Ben J.; and Zerod, Richard D., to Gulf & Western Manufacturing Company. System for detecting low liquid level and probe therefor. 4,591,839, Cl. 340-620.000.
Charbonnages de France: *See*—
Marcel, Frederic E.; and Maume, Francois J. M., 4,591,009, Cl. 175-320.000.
Charlebois, Leonard J.; and Brown, Peter A., to Northern Telecom Limited. Moulding equipment. 4,591,330, Cl. 425-567.000.
Chatterjee, Pallab K.; and Tasch, Al F., Jr., to Texas Instruments Incorporated. Post-metal electron beam programmable MOS read only memory. 4,591,891, Cl. 357-23.120.
Chelette, K. Darrel; and Evans, Merle E., to J. B. N. Morris. Pipe joint. 4,591,195, Cl. 285-332.300.
Chen, Tsuey I.: *See*—
Morris, Michael D.; and Chen, Tsuey I., 4,591,272, Cl. 356-432.000.
Chen, Yi-Yi. Hunting glove with pre-oriented forefinger sheath. 4,590,626, Cl. 2-163.000.
Cherian, Abraham, to Xerox Corporation. Sheet transport. 4,591,145, Cl. 271-258.000.
Chestnutt, John E. Fishhook removing tool. 4,590,702, Cl. 43-53.500.
Cheung, Yau T. Apparatus for forming fortune cookie shaped articles. 4,591,328, Cl. 425-324.100.
Chevron Research Company: *See*—
Hutchison, Stanley O.; Oldershaw, Paul V.; and Hansen, James E., 4,591,006, Cl. 175-52.000.
Krug, Russell R.; and Pettersen, Frederick A., 4,591,427, Cl. 208-161.000.
Chianelli, Russell R.: *See*—
Ho, Teh C.; Young, Archie R., II; Chianelli, Russell R.; and Jacobson, Allan J., 4,591,429, Cl. 208-254.00H.
Chiang, Robert L.; Perigard, Raymond G.; and Rabo, Jule A., to Union Carbide Corporation. Process for preparing catalytic cracking catalysts. 4,591,576, Cl. 502-65.000.
Chiang, William W. Microanalysis particle sampler. 4,590,792, Cl. 73-28.000.
Chiba, Shinsaku: *See*—
Sekiguchi, Yoshihiro; Yoshida, Kazutoshi; Chiba, Shinsaku; Sugie, Mamoru; and Aoki, Hirokazu, 4,592,016, Cl. 365-15.000.
Chikano, Takahide: *See*—
Yoshigi, Naohiro; Chikano, Takahide; and Mori, Yoshitada, 4,591,561, Cl. 435-101.000.
Chisso Corporation: *See*—
Kunimune, Kouichi; Kutsuzawa, Yoshiya; and Konotsune, Shiro, 4,591,653, Cl. 556-419.000.
Sato, Akihiro; Tachibana, Masami; Shimizu, Hiroshi; and Uwai, Toshihiro, 4,591,577, Cl. 502-105.000.
Suzuki, Takeshi; and Komori, Nobutoshi, 4,591,633, Cl. 528-485.000.
Chou, Ger-Chih: *See*—
Lee, Lin-Shan; Chou, Ger-Chih; and Chang, Ching-Sung, 4,591,673, Cl. 179-1.50R.
Chow, Peter E.; Weirich, Andreas H.; and Strawczynski, Leo, to Northern Telecom Limited. ADPCM encoder/decoder with improved tracking. 4,592,070, Cl. 375-27.000.
Chowhan, Zaka-ud-Din T., to Syntex (U.S.A.) Inc. Acid stabilized compositions of thieno-pyridine derived compounds. 4,591,592, Cl. 514-301.000.
Christenson, Roger M.: *See*—
Schillinger, William J.; Erikson, J. Alden; Dowbenko, Rostyslaw; and Christenson, Roger M., 4,591,518, Cl. 427-385.500.
Christian Dior, S.A.: *See*—
Gordon, Michael; and Curreri, John R., 4,591,183, Cl. 280-655.000.
Christie, Barbara C. Intravenous needle stabilizing band. 4,591,356, Cl. 604-179.000.
Christophliemk, Peter; and Wust, Willi, to Henkel Kommanditgesellschaft auf Aktien. Process for the continuous conversion of meta-kaolin into very finely-divided zeolitic sodium alumino-silicate. 4,591,491, Cl. 423-329.000.
Ciba-Geigy Corporation: *See*—
Scartazzini, Riccardo; and Bickel, Hans, 4,591,642, Cl. 544-16.000.
Schweizer, Ernst, 4,591,597, Cl. 514-392.000.
CIMA S.p.A.: *See*—
Lunazzi, Alessandro, 4,590,661, Cl. 29-568.000.
Cioca, Gheorghe, to Seton Company. Cosmetic and pharmaceutical sheet material containing polypeptides. 4,591,501, Cl. 424-28.000.
Citizen Watch Co., Ltd.: *See*—
Masubuchi, Sadao, 4,591,902, Cl. 358-59.000.
Clamp Swing Pricing Co.: *See*—
Garfinkle, Benjamin L., 4,591,057, Cl. 211-59.100.
Clapp, James A., Jr., to Champion Corporation. Dual-reel loader construction. 4,591,309, Cl. 414-546.000.
Clark, Fred C., to Canadian Security Printers Inc. Voucher with self-contained verification means. 4,591,190, Cl. 283-102.000.
Clark, Lloyd D.: *See*—
Day, Gene F.; and Clark, Lloyd D., 4,591,885, Cl. 346-159.000.
Clarke, Charles J., Jr.; and Staggs, Kevin P., to Honeywell Inc. Apparatus for controlling the background and foreground colors displayed by raster graphic system. 4,591,842, Cl. 340-723.000.
Clarke, James A. Chaff spreader for combine harvester. 4,591,102, Cl. 239-655.000.
Clayton, Stanley R.: *See*—
Bocker, Richard P.; Clayton, Stanley R.; and Bromley, Keith, 4,592,004, Cl. 364-713.000.
Clifford, Daniel: *See*—
Toste, Edward N., Jr.; and Clifford, Daniel, 4,591,046, Cl. 198-457.000.
Clive-Smith, Martin. Corner fitting with retractable twist lock. 4,591,307, Cl. 410-83.000.
Clot, Jean: *See*—
Levallois, Emile; Szabo, Rene; Clot, Jean; and Esteve, Daniel, 4,591,293, Cl. 405-170.000.
Clumpner, Joseph A.: *See*—
Sahai, Yogeshwar; and Clumpner, Joseph A., 4,591,338, Cl. 432-148.000.
Coca-Cola Company, The: *See*—
Credle, William S., Jr., 4,590,975, Cl. 141-1.000.
Coflexip: *See*—
Aubert, Jean P.; Bracon, Roland; and Ravasy, Bernard, 4,590,752, Cl. 57-9.000.
Cohen, Jonathan M.; Siegel, Ronald; and Langer, Robert, to Massachusetts Institute of Technology. Process for making systems for the controlled release of macromolecules. 4,591,496, Cl. 424-15.000.
Cohen, Mark E.; and Whiting, Carlton D., to United States of America, Energy. Method of identifying defective particle coatings. 4,591,478, Cl. 376-253.000.
Cojafex B.V.: *See*—
Hofstede, Johannes M., 4,591,436, Cl. 210-264.000.
Cole, Charles J.: *See*—
Lofquist, Robert A.; Weedon, Gene C.; and Cole, Charles J., 4,591,473, Cl. 264-129.000.
Cole, William M.: *See*—
Beattie, Joanne L.; and Cole, William M., 4,591,631, Cl. 528-930.000.
Colgate-Palmolive Company: *See*—
Weissman, Neal V., 4,591,078, Cl. 222-517.000.
Collins, Thomas D.; and Ross, Glenn D., to Sonoco Products Company. Carton divider with partition interlock. 4,591,090, Cl. 229-15.000.
Collipp, Bruce G., to Shell Offshore Inc. Curved conductor well template. 4,591,295, Cl. 405-195.000.
Collis, Dave L.: *See*—
Grabarek, Chester; and Collis, Dave L., 4,590,862, Cl. 102-522.000.
Colombo, Paolo: *See*—
Nistri, Ugo; Baroffio, Romano; and Colombo, Paolo, 4,591,450, Cl. 252-135.000.
Colonna, John P. Christmas tree light set. 4,591,227, Cl. 339-157.00C.
Colt Industries Operating Corp.: *See*—
Sciotti, Robert; and Mocko, Dean E., 4,590,911, Cl. 123-468.000.
Columbia Fabricators: *See*—
Scott, Harold H.; and Scott, Ralph K., 4,591,474, Cl. 264-253.000.
Combibloc, Inc.: *See*—
Wise, Daniel J., 4,591,091, Cl. 229-17.00G.
Combustion Engineering Co., Inc.: *See*—
Gardner, William N.; and Rohde, Kenneth R., 4,590,963, Cl. 137-554.000.
Comerford, Liam D., to International Business Machines Corporation. Versatile digital controller for light emitting semiconductor devices. 4,592,057, Cl. 372-8.000.
Comez S.p.A.: *See*—
Bonaschi, Antonio, 4,590,776, Cl. 66-205.000.
Commissariat a l'Energie Atomique: *See*—
Beaubatie, Jean; Cavarec, Francois; Lenclos, Jean-Francois; and Paris, Marc, 4,590,797, Cl. 73-295.000.
Bonnemay, Alain, 4,591,719, Cl. 250-357.100.
Fedeli, Jean M.; Jouve, Hubert; Magnin, Joel; and Pisella, Christian, 4,592,017, Cl. 365-19.000.
Communications Satellite Corporation: *See*—
Stegens, Ronald E.; and Hawisher, Gary G., 4,591,812, Cl. 333-116.000.
Compagnie Industrielle des Lasers Cilas Alcatel: *See*—
de Witte, Olivier, 4,592,065, Cl. 372-83.000.

Compagnie Internationale pour l'Informatique CII-Honeywell Bull (Societe Anonyme): *See—*
Ugon, Michel, 4,591,945, Cl. 361-212.000.
Complett S.p.A.: *See—*
Conti, Roberto, 4,590,878, Cl. 112-266.100.
Computer Memories, Incorporated: *See—*
Quackenbush, James E., 4,591,933, Cl. 360-78.000.
Congleton, Ray L.: *See—*
Tolino, Ralph W.; Hopkins, Ronald J.; Congleton, Ray L.; and Popalis, Craig H., 4,591,068, Cl. 220-240.000.
Connelly, John R., to Marmon Company. Curved glove construction utilizing elasticized threaded seams. 4,590,627, Cl. 2-163.000.
Conrad, Hans-Jurgen; and Pfeiffer, Eberhard, to Robert Bosch GmbH. Device for treating of work pieces with an explosive gas mixture. 4,591,339, Cl. 432-205.000.
Conrow, Ransom B.; and Bernstein, Seymour, to American Cyanamid Company. Method of inhibiting the complement system by administering multisulfonated naphthalene ureas. 4,591,604, Cl. 514-577.000.
Constant, Bernard: *See—*
Divoux, Michel; Constant, Bernard; and Ranchon, Marcel, 4,591,142, Cl. 271-196.000.
Conti, Roberto, to Complett S.p.A. Decorative stitch type and method of and apparatus for producing same. 4,590,878, Cl. 112-266.100.
Continental Gummi-Werke Aktiengesellschaft: *See—*
Kuhn, Heinz, 4,590,980, Cl. 152-323.000.
Control Energy Corporation: *See—*
Klima, Dennis P.; and Pakel, John E., 4,591,988, Cl. 364-464.000.
Coombs, Richard L.: *See—*
Henderson, Herman O., Jr.; and Coombs, Richard L., 4,591,296, Cl. 405-195.000.
Cooper, Edward, to Power Science, Inc. X-Y distinguishable multitrace coding for multiparameter recording of a single stylus recorder. 4,591,872, Cl. 346-62.000.
Cooper, Frank W., Jr.; Epperson, Thomas M.; Calhoun, Gregory L.; and Kucherer, Harvey D., to Westinghouse Electric Corp. Flexible stabilizer for degraded heat exchanger tubing. 4,590,991, Cl. 165-69.000.
Cooper Industries, Inc.: *See—*
Katsman, Ilya; Ritchie, John A.; Burmenko, Mark; and Zaltsman, Vladimir, 4,590,709, Cl. 49-396.000.
McClune, Glen E., 4,591,216, Cl. 339-14.00R.
Schumann, Peter R., 4,590,961, Cl. 137-355.160.
Cooper, John C.: *See—*
Panayappan, Ramanathan; and Cooper, John C., 4,591,510, Cl. 427-125.000.
Cooper, Michael D., to Texas Instruments Incorporated. Drive circuit for output pull-down transistor. 4,591,741, Cl. 307-456.000.
Cooperstein, Gerald: *See—*
Sohval, A. Robert; Cooperstein, Gerald; Goldstein, Shyke A.; and Hearn, David R., 4,592,079, Cl. 378-9.000.
Copeland Corporation: *See—*
Elson, John P., 4,591,318, Cl. 417-312.000.
Copple, Rebecca. Portable bicycle stand. 4,591,180, Cl. 280-293.000.
Cordis Corporation: *See—*
Pohndorf, Peter J., 4,590,949, Cl. 128-785.000.
Saulson, Stanley H.; Schroeppel, Edward A.; and Tarjan, Peter P., 4,590,941, Cl. 128-419.0PG.
Corn, Ronald J. Vacuum package for transit. 4,591,055, Cl. 206-459.000.
Cornell Research Foundation, Inc.: *See—*
Sachse, Wolfgang H.; and Sancar, Selcuk, 4,592,034, Cl. 367-127.000.
Corner, Horace B.: *See—*
Wirts, Harold L.; and Corner, Horace B., 4,591,110, Cl. 242-129.800.
Corning Glass Works: *See—*
Bagley, Rodney D.; and Herczog, Andrew, 4,591,947, Cl. 361-310.000.
McGarry, Charles N.; and Wehrenberg, Thomas M., 4,591,383, Cl. 75-93.00R.
Corsette, Douglas F. Continuous discharge dispenser. 4,591,077, Cl. 222-321.000.
Couch, Robert P.: *See—*
Shattuck, Alan B.; and Couch, Robert P., 4,591,794, Cl. 324-464.000.
Courtin, Olivier. Hand-held massager. 4,590,926, Cl. 128-67.000.
Cousyn, Bernard; Haddadi, Ahmed; and Hennequin, Jean-Claude, to Essilor International, Compagnie Generale d'Optique. Ocular parameter measuring device. 4,591,246, Cl. 351-204.000.
Crampton, John R.; and Whiting, Howard, to Laporte Industries Limited. Method for making absorbent materials. 4,591,581, Cl. 502-407.000.
Credle, William S., Jr., to Coca-Cola Company, The. Automatic beverage dispensing system. 4,590,975, Cl. 141-1.000.
Cretien, Georges: *See—*
Baills, Jean M.; and Cretien, Georges, 4,591,138, Cl. 269-32.000.
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; Mosser, Jacqueline; and Pontagnier, Henri, to Societe Cortial, S.A. 3-hydroxyflavones: their preparation and therapeutic application. 4,591,600, Cl. 514-456.000.
Crial, Richard S.: *See—*
Hinger, Gary W.; and Crial, Richard S., 4,591,685, Cl. 219-74.000.
Criscimagna, Tony N.; and Piston, Albert O., to International Business Machines Corporation. Method and apparatus for gas display panel. 4,591,847, Cl. 340-776.000.
Crophandling Systems Limited: *See—*
Byers, Stuart D., 4,591,067, Cl. 220-81.00R.
Cubic Corporation: *See—*
Fisher, Harrold, 4,591,251, Cl. 354-159.000.
Curl, Barry J.; and Chapman, Victor B., to De La Rue Systems Limited. Apparatus for scanning a sheet. 4,592,090, Cl. 382-7.000.
Curreri, John R.: *See—*
Gordon, Michael; and Curreri, John R., 4,591,183, Cl. 280-655.000.
Curtis, Donald E.; Vincent, James P.; and Weidmann, Mary E., to International Business Machines Corp. Calendar event description abbreviation. 4,591,840, Cl. 340-706.000.
Curtis, Richard H.: *See—*
Whipple, Rodger E.; and Curtis, Richard H., 4,591,517, Cl. 427-378.000.
Cusey, Dar L.; and Kitchens, Roy A., tc National Industries, Inc. Collapsible motor operated antenna. 4,591,868, Cl. 343-903.000.
Cushman, Cloyd. Screwdriver. 4,590,824, Cl. 81-440.000.
Cutter, Jack. Animal trap. 4,590,703, Cl. 43-61.000.
Czech, Franz; and Floessel, Carl D., to BBC Brown, Boveri & Company Ltd. Metal-encapsulated gas-insulated high-voltage line. 4,591,655, Cl. 174-22.00C.
Czichy, Eleonore, to Interletter AG. Composite foil from which layer areas having metallic luster are transferred onto a base. 4,591,527, Cl. 428-201.000.
Da Foe, John P. Load actuating braking apparatus. 4,591,029, Cl. 188-134.000.
Dahlgren, Harold P. Ink metering apparatus. 4,590,857, Cl. 101-350.000.
Daimler-Benz AG: *See—*
Fortnagel, Manfred, 4,591,101, Cl. 239-533.120.
Daimler-Benz Aktiengesellschaft: *See—*
Burk, Gerhard; and Mordau, Manfred, 4,591,202, Cl. 296-194.000.
Gallitzendoerfer, Joseph; Pfeiffer, Peter; Tomforde, Johann; and Hellhake, Ferdinand, 4,591,204, Cl. 296-202.000.
Hiereth, Hermann, 4,590,889, Cl. 123-41.050.
Dainippon Ink and Chemicals, Inc.: *See—*
Nakamura, Chiaki; Oe, Kouji; Muta, Tomonobu; and Sasaki, Toshiki, 4,591,545, Cl. 430-284.000.
Dainippon Screen Mfg. Co., Ltd.: *See—*
Mitsuka, Ikuo, 4,591,880, Cl. 346-108.000.
Ogami, Nobutoshi; and Mori, Noritaki, 4,591,044, Cl. 198-346.300.
Dalhoff, Willi: *See—*
Oltmanns, Heinrich; Granz, Axel; Dalhoff, Willi; and Othold, Rolf, 4,591,193, Cl. 285-138.000.
D'Ambra, Roberto: *See—*
Gazzi, Luigi; D'Ambra, Roberto; Di Cintio, Roberto; Rescalli, Carlo; and Vetere, Alessandro, 4,591,370, Cl. 62-17.000.
D'Anci, Alexander, to Intelligent Controls, Inc. Position angle transducer for tap changing transformers. 4,591,831, Cl. 340-347.0SY.
Dane, John A. Parabolic reflector. 4,590,921, Cl. 126-438.000.
Daniels, Richard J.: *See—*
Bialas, John S., Jr.; Daniels, Richard J.; and Mruk, William J., 4,591,738, Cl. 307-296.00R.
Darlington, John; and Reeve, Michael J., to National Research Development Corporation. Method and apparatus for parallel processing of digital signals using multiple independent signal processors. 4,591,971, Cl. 364-200.000.
Das, Jagabandhu, to E. R. Squibb & Sons, Inc. 7-oxabicycloheptane substituted prostaglandin analogs useful in the treatment of thrombotic disease. 4,591,603, Cl. 514-469.000.
Dasher, Luther W.: *See—*
Wagner, Daniel B.; and Dasher, Luther W., 4,591,569, Cl. 436-500.000.
DASI Industries, Inc.: *See—*
Nahra, John E.; and Woods, Walter, 4,591,463, Cl. 261-116.000.
Data General Corp.: *See—*
Guyer, James M.; Epstein, David I.; and Keating, David L., 4,591,972, Cl. 364-200.000.
Wade, Donald A.; Wagner, Eric M.; Krantz, Lawrence L.; and Goodman, R. W., 4,591,975, Cl. 364-200.000.
Dataproducts Corporation: *See—*
Ferris, Timothy A.; Fortescue, Stephen M.; and Palombo, Gaston, 4,591,774, Cl. 318-696.000.
Davidov, Mircho A.; and Katzfey, Lance, to Oak Industries Inc. Remote volume control by means of frequency modulation feedback loop. 4,591,915, Cl. 358-194.100.
Davidson, Arthur R.; and Livermore, Richard S., to Amfac Foods Monterey, Inc. Food slicing method and apparatus. 4,590,829, Cl. 83-22.000.
Davidson, Eric H.: *See—*
Britten, Roy J.; and Davidson, Eric H., 4,591,567, Cl. 435-293.000.
Davis, Gregory B.: *See—*
Buchanan, Michael S.; and Davis, Gregory B., 4,591,469, Cl. 264-45.300.
Davis, Gregory G. Apparatus for priming cartridges. 4,590,841, Cl. 86-36.000.
Davis, James A.: *See—*
Beckner, Mark W.; Davis, James A.; Gausmann, Eric J.; Hiller, Thomas L.; Olson, Philip D.; and Van Dine, Gilbert A., 4,592,048, Cl. 370-60.000.
Davis, Larry; and Klein, Joseph T., to Hoechst-Roussel Pharmaceuticals. 6-fluoro-3-[3-(1-heterocyclo)propyl]-1,2-benzisoxazoles for treatment of pain, hypertension and psychoses. 4,591,586, Cl. 514-211.000.
Davis, Walter L., to Motorola, Inc. Low power, low voltage oscillator. 4,591,807, Cl. 331-116.00R.
Day, Gene F.; and Clark, Lloyd D., to Xerox Corporation. Ion projection copier. 4,591,885, Cl. 346-159.000.

De La Rue Systems Limited: *See—*
Curl, Barry J.; and Chapman, Victor B., 4,592,090, Cl. 382-7.000.
De Vlamboog B.V.: *See—*
Van Reijmersdal, Joseph J. A., 4,591,690, Cl. 219-138.000.
Deaccelerator Corporation: *See—*
Heintz, Richard P., 4,590,909, Cl. 123-360.000.
Dearden, Katryna J.: *See—*
Atkinson, Alan W.; Dearden, Katryna J.; Doyle, Christina; Lancaster, Janet M.; Marshall, Kenneth H.; and Robinson, Kay L., 4,591,166, Cl. 277-1.000.
de Belder, Anthony N.: *See—*
Ahrgren, Leif G.; and de Belder, Anthony N., 4,591,638, Cl. 536-51.000.
deBoer, Eeltje; and Huijser, Arie, to U.S. Philips Corporation. Signal-dropout correction circuit for correcting video signals disturbed by signal dropouts. 4,591,898, Cl. 358-36.000.
De Brouckere, Lucien C.; Caers, Ludo M. J.; and Verbert, Karel H., to International Standard Electric Corporation. Electrically conductive device. 4,591,221, Cl. 339-19.000.
DeCarlo, Joseph D., to United States of America, Navy. Automatic/-manual fuel tank supply balance system. 4,591,115, Cl. 244-135.00C.
Deere & Company: *See—*
Bernard, Jerald D.; and Koltookian, Sarkis A., 4,591,129, Cl. 251-64.000.
Meinert, Harry M., 4,591,002, Cl. 172-510.000.
Steilen, Ronald M., 4,590,869, Cl. 111-88.000.
Stephenson, Roger D., 4,590,751, Cl. 56-192.000.
de Geest, Theo: *See—*
Versaw, Douglas P.; and de Geest, Theo, 4,591,822, Cl. 337-380.000.
DeGooyer, Lonnie C. Tile reinforcing grid. 4,590,731, Cl. 52-581.000.
De Gray, William G. Aloe vera leaf processor. 4,591,387, Cl. 127-24.000.
DeGregorio, Anthony, to Preferred Services, Ltd. Fountain device. 4,590,628, Cl. 4-191.000.
Degulis, David C.: *See—*
Arbree, Roberta R.; Degulis, David C.; Goodwin, Henry W.; and Veillette, Norman T., 4,591,887, Cl. 346-200.000.
Degussa Aktiengesellschaft: *See—*
Nawaz, M. H. A, 4,591,483, Cl. 420-463.000.
Del Mar Avionics: *See—*
Shu, Stephen K., 4,591,708, Cl. 250-221.000.
De LaCruz, Richard: *See—*
Parente, Richard E.; and De LaCruz, Richard, 4,591,157, Cl. 273-80.00B.
Del Fabro, Michael: *See—*
Schneider, Karl-Heinz; Paeschke, Otto; Del Fabro, Michael; and Loeser, Norbert, 4,591,276, Cl. 384-206.000.
Del Felice, Gianmarco: *See—*
Cazzaro, Giorgio; Cavallaro, Antonino; Casagrande, Gianfranco; and Del Felice, Gianmarco, 4,591,361, Cl. 8-538.000.
Della Torre, Giancarlo: *See—*
Sanvito, Roberto; Fietta, Emilio; and Della Torre, Giancarlo, 4,590,875, Cl. 112-168.000.
Dellinger, Vernon D.: *See—*
Bauer, Claude J.; Dellinger, Vernon D.; and Leep, Oral F., 4,591,658, Cl. 174-65.00R.
Dellinger, Wayne D.: *See—*
Shaffer, Jacob E.; Dellinger, Wayne D.; and Harnish, James R., 4,590,771, Cl. 62-156.000.
Delmas, Michel; Gaset, Antoine; and Le Bigot, Yves, to Agrifurane S.A. Process for directly converting an aldehyde into an ethylene ester. 4,591,651, Cl. 549-473.000.
Delprato, Ivano, to Minnesota Mining and Manufacturing Company. Cyan dye-forming couplers and photographic elements and processes. 4,591,548, Cl. 430-389.000.
De Martelaere, Gary E.: *See—*
Stange, Ronald R.; Ekren, Dennis J.; and De Martelaere, Gary E., 4,590,779, Cl. 72-294.000.
Demers, Donald R.; and Allemand, Charly D., to Baird Corporation. Spectrometer. 4,591,267, Cl. 356-316.000.
Deneke, Ulfert; Gruber, Wolfgang; and Batz, Hans-Georg, to Boehringer Mannheim GmbH. Process and analytical agent for the determination of the activity of glutamate-oxalacetate-transaminase. 4,591,553, Cl. 435-16.000.
Deniega, Jose C., to American Cyanamid Company. Nonmetallic surgical clip. 4,590,937, Cl. 128-325.000.
Denki Kagaku Kogyo Kabushiki Kaisha: *See—*
Hagiwara, Hirotoshi; Hiraoka, Hideo; and Ishii, Masaji, 4,591,754, Cl. 313-336.000.
Kitsunai, Tomoyuki; Saito, Kiyotaka; and Hori, Shozo, 4,591,619, Cl. 525-285.000.
Dennis, Charles L., to Mobil Oil Corporation. Apparatus for improving the data transmission rate in a telemetry system. 4,592,033, Cl. 367-76.000.
DePasquale, Ralph J.; and Wilson, Michael E., to SCM Corporation. Polyhydroxyl silanes or siloxanes. 4,591,652, Cl. 556-419.000.
DeQuattro, Vincent; and Kobayashi, Kiyoshi, to University of Southern California. Radioenzymatic method for assaying normetanephrine and octopamine. 4,591,551, Cl. 435-15.000.
Devaux, Alain, to Societe d'Etudes de Machines Thermiques S.E.M.T., S.A. Method and apparatus for removing pressure peaks and damping hydraulic pressure waves and peaks from pressure variations in the feed ducts of a hydraulic pump and a pump for implementing the method. 4,591,321, Cl. 417-499.000.
Devic, Michel, to Atochem. Process for the decomposition of a complex of orthobenzoyl-benzoic acid, hydrogen fluoride and boron trifluoride. 4,591,460, Cl. 260-369.000.
De Villez, Richard L., to Brown, James H. Ozonide esters and topical compositions containing same. 4,591,602, Cl. 514-463.000.
de Vries, Bartholomeus: *See—*
Bodor, Janos; Heslinga, Lammert; van Heteren, Jan; and de Vries, Bartholomeus, 4,591,507, Cl. 426-604.000.
Devro, Inc.: *See—*
Temple, Stephen; Jones, Nigel J.; and Syrop, Alan N., 4,590,749, Cl. 53-576.000.
de Witte, Olivier, to Compagnie Industrielle des Lasers Cilas Alcatel. Gas laser excited by a transverse electrical discharge triggered by photoionization. 4,592,065, Cl. 372-83.000.
Di Cintio, Roberto: *See—*
Gazzi, Luigi; D'Ambra, Roberto; Di Cintio, Roberto; Rescalli, Carlo; and Vetere, Alessandro, 4,591,370, Cl. 62-17.000.
Dickerson, Arthur F. Inverter for use with solar arrays. 4,591,965, Cl. 363-43.000.
Dickinson, David J.; and Gray, Scarlette M., to National Research Development Corp. Method of impregnating wood. 4,591,515, Cl. 427-297.000.
Dickson, LeRoy D.: *See—*
Broockman, Eric C.; Cato, Robert T.; and Dickson, LeRoy D., 4,591,242, Cl. 350-3.710.
Diehl GmbH & Co.: *See—*
Bugiel, Horst G., 4,590,861, Cl. 102-501.000.
Kruger, Tilmann; Arnold, Werner; and Scheumann, Leonhard, 4,591,728, Cl. 307-75.000.
Diemer, Peter: *See—*
Wohner, Hans J.; Pappmann, Wilfried; and Diemer, Peter, 4,591,366, Cl. 55-20.000.
Di Giovanni, John, to Ethicon, Inc. Surgical instrument for applying fasteners, said instrument having an improved trigger interlocking mechanism (Case VI). 4,591,085, Cl. 227-8.000.
Dillon, Richard S. System for promoting the circulation of blood. 4,590,925, Cl. 128-24.00R.
Director of National Food Research Institute Ministry of Agriculture, Forstry and Fisheries: *See—*
Kainuma, Keiji; and Kobayashi, Shoichi, 4,591,560, Cl. 435-96.000.
Divoux, Michel; Constant, Bernard; and Ranchon, Marcel, to Hotchkiss-Brandt Sogeme H.B.S. Stacker for flat objects. 4,591,142, Cl. 271-196.000.
Dixit, Ajit S., to Olin Corporation. Cigarette paper with reduced CO on burning. 4,590,955, Cl. 131-365.000.
Dr. Ing. H.c.F Porsche AG: *See—*
Striebich, Helmut, 4,590,766, Cl. 60-618.000.
Dohi, Hideyuki: *See—*
Sato, Atsushi; Endo, Keiji; Kawakami, Shigenobu; and Dohi, Hideyuki, 4,591,948, Cl. 361-315.000.
Dohrendorf, Hans A., to Nordson Corporation. Vertical packaging machine. 4,590,735, Cl. 53-77.000.
Doiron, Gerald J., to Omark Industries, Inc. Safety chain for chain saws. 4,590,836, Cl. 83-834.000.
Dols, Hubert J.: *See—*
Leerschool, Joseph F. M.; and Dols, Hubert J., 4,591,644, Cl. 544-201.000.
Domeisen, Bruno: *See—*
El-Ghatta, Hussain; Philipp, Hans-Werner; Sailer, Richard; and Domeisen, Bruno, 4,591,629, Cl. 528-308.200.
Domon, Tomokazu: *See—*
Kobayashi, Tadahiko; Sahashi, Masashi; Inomata, Koichiro; Domon, Tomokazu; and Fukuda, Hironori, 4,590,807, Cl. 73-862.360.
Dopp, Robert B.: *See—*
Oltman, John E.; Carpenter, Denis D.; and Dopp, Robert B., 4,591,539, Cl. 429-27.000.
Dornbush, Donald H.; and Bowersox, Donald J., to Technology Venture Management, Inc. Information recording and retrieval system. 4,591,974, Cl. 364-200.000.
Dornes, Bryan J.; Kautz, Jon F.; Paukovits, Edward J., Jr.; Spong, Richard V.; Talarico, Robert J.; and Prescott, Harry G., to AMP Incorporated. Force-fitting components into a workpiece. 4,590,673, Cl. 29-845.000.
Dornier System GmbH: *See—*
Scherber, Werner, 4,591,717, Cl. 250-338.000.
Doryokuro Kakunenryo Kaihatsu Jigyodan: *See—*
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Yanagida, Koji; Kitagawa, Kazuo; Ochiai, Atsuhiro; Harada, Minoru; and Matsumoto, Hiroshi, 4,591,454, Cl. 252-626.000.
Dow Corning Corporation: *See—*
Blizzard, John D.; and Swihart, Terence J., 4,591,622, Cl. 525-477.000.
Dowbenko, Rostyslaw: *See—*
Schillinger, William J.; Erikson, J. Alden; Dowbenko, Rostyslaw; and Christenson, Roger M., 4,591,518, Cl. 427-385.500.
Dowell Schlumberger Incorporated: *See—*
Kubala, Gregory, 4,591,447, Cl. 252-8.55C.
Downing, Edward J.: *See—*
Holmen, Reynold E.; and Downing, Edward J., 4,591,189, Cl. 283-83.000.
Doyle, Christina: *See—*
Atkinson, Alan W.; Dearden, Katryna J.; Doyle, Christina; Lancaster, Janet M.; Marshall, Kenneth H.; and Robinson, Kay L., 4,591,166, Cl. 277-1.000.

Doyle, Raymond E. Hospital I.V. pole adjunct. 4,591,121, Cl. 248-201.000.

Doyle, Walter M., to Laser Precision Corporation. Parabolic focusing apparatus for optical spectroscopy. 4,591,266, Cl. 356-244.000.

Drabkin, Mark: *See—*
Carpenter, Roy B., Jr.; and Drabkin, Mark, 4,591,779, Cl. 323-301.000.

Dragerwerk AG: *See—*
van der Smissen, Carl E.; and Ernst, Rainer, 4,591,399, Cl. 149-2.000.

Dresser Industries, Inc.: *See—*
Eckman, Richard E., 4,591,299, Cl. 408-1.00R.
Erickson, John W., 4,591,024, Cl. 184-11.200.
Hambric, James C., 4,590,820, Cl. 74-640.000.

DrM Dr. Muller AG: *See—*
Muller, Hans, 4,591,446, Cl. 210-797.000.

Droscher, Bernhard; Schetina, Otto; Wrulich, Herwig; and Zitz, Alfred, to Voest-Alpine Aktiengesellschaft. Protecting device for partial-cut cutting machines. 4,591,209, Cl. 299-1.000.

Dumoulin, Andre : *See—*
Bouffard, Jean; Dumoulin, Andre ; and Seguin, Marc, 4,590,754, Cl. 57-58.550.

Du Pont de Nemours, E. I., and Company: *See—*
Antonelli, Joseph A.; and Hazan, Isidor, 4,591,533, Cl. 428-520.000.
Ennis, Royce E., 4,591,621, Cl. 525-344.000.
Grot, Walther G., 4,591,439, Cl. 210-638.000.
Levitt, George, 4,591,378, Cl. 71-93.000.

Duro-Test Corporation: *See—*
Thouret, Wolfgang E.; Kaufman, Rudolph; and Kee, Harry, 4,591,752, Cl. 313-25.000.

Duroyon, Herve D.; and Sene, Jean-Michel M., to Union Carbide Corporation. Method and apparatus for controlling casing holdback. 4,590,830, Cl. 17-49.000.

Dusko, Carl E. Beverage can opening apparatus. 4,590,822, Cl. 81-3.550.

Duttweiler, Donald L.; and Hartung, John, to AT&T Bell Laboratories. Adaptive filter update gain normalization. 4,591,669, Cl. 179-170.200.

Dyke, Peter J.: *See—*
Jessop, Anthony; Catchpole, Richard J.; Dyke, Peter J.; and Farley, Brian S., 4,592,068, Cl. 375-3.000.

Dynacast International Limited: *See—*
Greenwood, David; and Smith, Roger J., 4,591,476, Cl. 264-328.140.

Dynachem Corporation: *See—*
Garber, John L., 4,591,406, Cl. 156-484.000.

Dynapac AB: *See—*
Furmanski, Walery, 4,590,802, Cl. 73-573.000.

E.N.I. Ente Nazionale Idrocarburi: *See—*
Marconi, Walter; Bartoli, Francesco; Morisi, Franco; and Pittalis, Francesco, 4,591,596, Cl. 514-375.000.

E. R. Squibb & Sons, Inc.: *See—*
Das, Jagabandhu, 4,591,603, Cl. 514-469.000.

E-Systems, Inc.: *See—*
Masheff, Michael S., 4,592,009, Cl. 364-821.000.

E-Zee Company: *See—*
Elliott, Alton M., Jr., 4,591,093, Cl. 236-94.000.

Eastman Kodak Company: *See—*
Baumeister, Hans-Peter, 4,591,930, Cl. 360-35.100.
Baumeister, Hans-Peter, 4,591,931, Cl. 360-72.100.
Braun, Hilarion; Brown, Mark E.; and Piatt, Michael J., 4,591,870, Cl. 346-1.100.
Katerberg, James A.; Kopp, Gregory M.; and Piatt, Michael J., 4,591,869, Cl. 346-1.100.
McCann, James D.; Piatt, Michael J.; and Williams, Theodore F., 4,591,873, Cl. 346-75.000.
McCann, James D., 4,591,875, Cl. 346-75.000.
Piatt, Michael J., 4,591,874, Cl. 346-75.000.

Eaton Corporation: *See—*
Bopp, Warren G., 4,591,037, Cl. 192-58.00B.
Buente, Stephen M.; and Mihalic, William T., 4,590,898, Cl. 123-90.550.

Eaton, Steven G.; and Siddall, Graham J., to Varian Associates, Inc. Adaptive X-ray lithography mask. 4,592,081, Cl. 378-34.000.

Ebara-Udylite Co., Ltd.: *See—*
Kamitani, Masaaki; and Tsuji, Hidenori, 4,591,416, Cl. 204-35.100.

Eberhard, Eugen: *See—*
Straub, Reinhold; and Eberhard, Eugen, 4,590,936, Cl. 128-305.000.

Eberle, Gunter. Device sedimentation of a sample liquid and a sample examination system. 4,591,486, Cl. 422-72.000.

Eckel, Emery L.: *See—*
Neves, Billy W.; and Eckel, Emery L., 4,590,823, Cl. 81-57.140.

Eckel Manufacturing Company, Inc.: *See—*
Neves, Billy W.; and Eckel, Emery L., 4,590,823, Cl. 81-57.140.

Eckel:, Ulrich, to Windmoller & Holscher. Apparatus for applying web sections to a flat workpiece. 4,590,832, Cl. 83-100.000.

Eckman, Richard E., to Dresser Industries, Inc. Rapid feed apparatus for automatic feed drills or the like. 4,591,299, Cl. 408-1.00R.

Edelson, Steven D. System for generating a display of graphic objects over a video camera picture. 4,591,897, Cl. 358-22.000.

Eden Research Laboratories, Inc.: *See—*
Arsem, Harold B., 4,590,684, Cl. 34-5.000.

Eder, Ulrich: *See—*
Kerb, Ulrich; Eder, Ulrich; and Krahmer, Hansjorg, 4,591,650, Cl. 549-268.000.

EG&G Washington Analytical Services Center Inc.: *See—*
Gruchalla, Michael E.; and Koller, David C., 4,591,941, Cl. 361-42.000.

Ehle, Joachim: *See—*
Fuchs, Gerhard; Ehle, Joachim; and Heinzelmann, Hans-Peter, 4,592,067, Cl. 373-83.000.

Eigtved, Peter: *See—*
Branner-Jorgensen, Sven; Schneider, Palle; and Eigtved, Peter, 4,591,565, Cl. 435-223.000.

Eisen, Mark B. Electric soldering gun with work clamping device for the soldering tip. 4,591,696, Cl. 219-230.000.

Eke, Kenneth I., to Microwave Ovens Limited. Microwave ovens and methods of cooking food. 4,591,683, Cl. 219-10.55B.

Ekren, Dennis J.: *See—*
Stange, Ronald R.; Ekren, Dennis J.; and De Martelaere, Gary E., 4,590,779, Cl. 72-294.000.

El-Banna, Mahmoud A. S., to Novatel Communications Ltd. Synchronizing signal recovery circuit for radiotelephones. 4,592,076, Cl. 375-108.000.

Elder, Hugh Y.: *See—*
Biddlecombe, William H.; Elder, Hugh Y.; and Nicholson, W. A. Patrick, 4,591,722, Cl. 250-443.100.

Eldridge, John D., Jr., to American Hospital Supply Corp. Disposable collector for surgical implements. 4,591,048, Cl. 206-63.300.

Electric Power Research Institute: *See—*
Wenglarz, Richard A., 4,591,312, Cl. 415-121.00R.

Electricite de France: *See—*
Sabrie , Jean-Louis, 4,591,776, Cl. 318-717.000.

Electricite de France Service National: *See—*
Massot, Jean-Claude, 4,590,686, Cl. 34-86.000.

Electro-Matic Products Co.: *See—*
Armond, Joseph A., 4,591,943, Cl. 361-145.000.

Electro Mechanical Systems, Inc.: *See—*
Komadina, Bruce M.; Lazarevich, Vladeta D.; and Beining, August H., 4,591,710, Cl. 250-221.000.

Elektro-Apparatebau Olten AG: *See—*
Thalmann, Rene A., 4,591,712, Cl. 250-227.000.

El-Ghatta, Hussain; Philipp, Hans-Werner; Sailer, Richard; and Domeisen, Bruno, to EMS-Inventa AG. Process for the purification of high molecular weight polyesters. 4,591,629, Cl. 528-308.200.

Eli Lilly and Company: *See—*
Robertson, David W., 4,591,591, Cl. 514-254.000.

El-Kilani, Saddah: *See—*
Sherwood, Michael D.; Gregor, William T.; Snyder, Kenneth D.; El-Kilani, Saddah; and Roth, Richard W., 4,591,704, Cl. 235-380.000.

Elliott, Alton M., Jr., to E-Zee Company. Calibration apparatus for air flow controllers. 4,591,093, Cl. 236-94.000.

Elliott, Guy R. B. Process and apparatus for recovering and purifying uranium scrap. 4,591,382, Cl. 75-84.10R.

Ellwein, Andrew G.: *See—*
Ellwein, Clarence G., 4,591,152, Cl. 273-1.0GG.

Ellwein, Clarence G., to Ellwein, Laura; Ellwein, Mark D.; and Ellwein, Andrew G., a part interest to each. Toy comprising interconnecting rods. 4,591,152, Cl. 273-1.0GG.

Ellwein, Laura: *See—*
Ellwein, Clarence G., 4,591,152, Cl. 273-1.0GG.

Ellwein, Mark D.: *See—*
Ellwein, Clarence G., 4,591,152, Cl. 273-1.0GG.

Elscint Ltd.: *See—*
Sohval, A. Robert; Cooperstein, Gerald; Goldstein, Shyke A.; and Hearn, David R., 4,592,079, Cl. 378-9.000.

Elson, John P., to Copeland Corporation. Dual compressors. 4,591,318, Cl. 417-312.000.

Elton, Raymond C., to United States of America, Navy. Resonant photon pumping mechanisms for a plasma x-ray laser. 4,592,056, Cl. 372-5.000.

Embru-Werke, Mantel & CIA: *See—*
Rutsche, Wendolin; and Langenegger, Urs, 4,590,865, Cl. 108-1.000.

Emeraldine Limited: *See—*
Blight, Marshall R., 4,591,164, Cl. 273-425.000.

Emerson Electric Co.: *See—*
Peachee, C. Theodore, Jr., 4,590,668, Cl. 29-596.000.

Emmons, Barry L.: *See—*
Volk, Seymour A., 4,590,704, Cl. 43-61.000.

Emmons, Charley Carl: *See—*
Volk, Seymour A., 4,590,704, Cl. 43-61.000.

Emory, Lyle J.; and Jones, Courtney J., to Spraying Systems Co. Nozzle to provide fan-shaped spray pattern. 4,591,099, Cl. 239-419.000.

EMS-Inventa AG: *See—*
El-Ghatta, Hussain; Philipp, Hans-Werner; Sailer, Richard; and Domeisen, Bruno, 4,591,629, Cl. 528-308.200.

Endo, Keiji: *See—*
Sato, Atsushi; Endo, Keiji; Kawakami, Shigenobu; and Dohi, Hideyuki, 4,591,948, Cl. 361-315.000.

Enei, Hitoshi: *See—*
Kurahashi, Osamu; Tsuchida, Takayasu; Kawashima, Hiroki; and Enei, Hitoshi, 4,591,562, Cl. 435-108.000.

Energy Sciences, Inc.: *See—*
Avnery, Tzvi, 4,591,756, Cl. 313-420.000.

Enersen, Richard W. Handle for plastic bag. 4,590,640, Cl. 16-114.00B.

Engelbart, Wilhelm, to Maschinenfabrik Herbert Meyer KG. Device for picking up planar work pieces. 4,591,139, Cl. 271-9.000.

Engelke, Helmut: *See—*
Bohlen, Harald; Bretscher, Erwin; Engelke, Helmut; Nehmiz, Peter; Vettiger, Peter; and Greschner, Johann, 4,591,540, Cl. 430-22.000.

Engineered Systems, Inc.: *See—*
Sherwood, Michael D.; Gregor, William T.; Snyder, Kenneth D.; El-Kilani, Saddah; and Roth, Richard W., 4,591,704, Cl. 235-380.000.

Englund, Allan H. E.; and Eriksson, Stefan G., to Telefonaktiebolaget LM Ericsson. Attenuation apparatus for an aerial array. 4,591,867, Cl. 343-841.000.

Engstrom, Bertil: *See—*
Spinell, Max; and Engstrom, Bertil, 4,591,445, Cl. 210-781.000.

Enjo, Sadamichi; Tsukiji, Yasuhiko; Wakatsuki, Goroei; and Noguchi, Toushi, to Honda Giken Kogyo Kabushiki Kaisha. Bicycle with an auxiliary engine. 4,591,017, Cl. 180-205.000.

Ennis, Royce E., to Du Pont de Nemours, E. I., and Company. Chlorinated polyethylene elastomers. 4,591,621, Cl. 525-344.000.

Epperson, Thomas M.: *See—*
Cooper, Frank W., Jr.; Epperson, Thomas M.; Calhoun, Gregory L.; and Kucherer, Harvey D., 4,590,991, Cl. 165-69.000.

Epstein, David I.: *See—*
Guyer, James M.; Epstein, David I.; and Keating, David L., 4,591,972, Cl. 364-200.000.

Epsztein, Bernard: *See—*
Faillon, Georges; and Epsztein, Bernard, 4,591,799, Cl. 330-45.000.

Erca Holding, S.A.R.L.: *See—*
Hautemont, Jean-Claude, 4,591,327, Cl. 425-305.100.

Erdei, Janos: *See—*
Kovacs, Antal; Erdei, Janos; Kovats, Karoly; Polya, Laszlo ; Pasztor, Karoly; Nagy, Janos; Pepo , Pal; Pepo , Peter; Kiss, Gyorgy; and Kajati, Istvan, 4,591,379, Cl. 71-94.000.

Erickson, John W., to Dresser Industries, Inc. Lube oil ring pump. 4,591,024, Cl. 184-11.200.

Erikson, J. Alden: *See—*
Schillinger, William J.; Erikson, J. Alden; Dowbenko, Rostyslaw; and Christenson, Roger M., 4,591,518, Cl. 427-385.500.

Eriksson, Hans E., to Norvale AB. Activator for fluidizing slow-moving material in containers. 4,591,075, Cl. 222-195.000.

Eriksson, Stefan G.: *See—*
Englund, Allan H. E.; and Eriksson, Stefan G., 4,591,867, Cl. 343-841.000.

Ernest, Michael V.: *See—*
Kim, Gwan; and Ernest, Michael V., 4,591,580, Cl. 502-303.000.

ERNO Raumfahrttechnik GmbH: *See—*
Guenther, Hans-Jurgen; Nauck, Joachim; Renner, Udo; and Fehse, Wigbert, 4,591,116, Cl. 244-168.000.

Ernryd, Leif W.; Carbol, Vlastimil; and Carbol, Paul, to Leif Ernryd AB. Apparatus for separating solid particles from a liquid. 4,591,437, Cl. 210-265.000.

Ernst, Horst M.: *See—*
Olschewski, Armin; Brandenstein, Manfred; Walter, Lothar; and Ernst, Horst M., 4,591,352, Cl. 474-95.000.

Ernst, Rainer: *See—*
van der Smissen, Carl E.; and Ernst, Rainer, 4,591,399, Cl. 149-2.000.

Erwin Sick GmbH Optik-Elektronik: *See—*
Schenk, Christoph, 4,591,726, Cl. 250-572.000.

Escobosa, Alfonso S. All-digital electrically powered servo. 4,590,764, Cl. 60-390.000.

Essex Group, Inc.: *See—*
Balian, Basil A.; and Busch, Charles R., 4,591,084, Cl. 226-118.000.

Essilor International, Compagnie Generale d'Optique: *See—*
Cousyn, Bernard; Haddadi, Ahmed; and Hennequin, Jean-Claude, 4,591,246, Cl. 351-204.000.

Esteve, Daniel: *See—*
Levallois, Emile; Szabo, Rene; Clot, Jean; and Esteve, Daniel, 4,591,293, Cl. 405-170.000.

Ethicon, Inc.: *See—*
Di Giovanni, John, 4,591,085, Cl. 227-8.000.
Gertzman, Arthur; and Thompson, Darrell R., 4,591,630, Cl. 528-503.000.

Etudes Techniques-Franche-Comte-Alsace Etfa, Sarl: *See—*
Baills, Jean M.; and Cretien, Georges, 4,591,138, Cl. 269-32.000.

Evans, Charles B.; and Murray, William J., to LTV Aerospace and Defense Company. Apparatus and method for manufacturing composite structures. 4,591,402, Cl. 156-350.000.

Evans, Merle E.: *See—*
Chelette, K. Darrel; and Evans, Merle E., 4,591,195, Cl. 285-332.300.

Evans, Robert T., to Halliburton Company. Retrievable straddle packer. 4,590,995, Cl. 166-127.000.

Everett J. Prescott, Inc.: *See—*
Prescott, Everett J., 4,591,290, Cl. 404-25.000.

Everitt, Delmar K.: *See—*
Goldfarb, Adolph E.; Everitt, Delmar K.; and Burger, Norman J., 4,591,347, Cl. 446-462.000.

Everitt, Gary. Flue cleaning apparatus. 4,591,389, Cl. 134-8.000.

Ex-Cell-O Corporation: *See—*
Gauthier, Robert E.; and Susser, Mark, 4,591,749, Cl. 310-156.000.
Halvorsen, Robert M.; and Hurst, Jeffrey B., 4,590,768, Cl. 60-741.000.
Rodocker, Frank A., 4,590,740, Cl. 53-426.000.

Exxon Production Research Co.: *See—*
Kane, Russell D.; Greer, James B.; Jacobs, Dawn F.; and Berkowitz, Barry J., 4,591,393, Cl. 148-11.50N.

Exxon Research and Engineering Co.: *See—*
Ho, Teh C.; Young, Archie R., II; Chianelli, Russell R.; and Jacobson, Allan J., 4,591,429, Cl. 208-254.00H.
Hudson, Carl W., 4,591,430, Cl. 208-254.00H.
Kane, Russell D.; Greer, James B.; Jacobs, Dawn F.; and Berkowitz, Barry J., 4,591,393, Cl. 148-11.50N.

Fahmuller, Max, to Schubert & Salzer. Device for cleaning rotating rollers of textile machines. 4,590,647, Cl. 19-262.000.

Faillon, Georges; and Epsztein, Bernard, to Thomson-CSF. High power klystron amplifier for supplying a variable load. 4,591,799, Cl. 330-45.000.

Fakhoury, Joseph I. Deck or pack of cards for playing multiple lottery games. 4,591,162, Cl. 273-303.000.

Fama, Joseph T., to Fama, Joseph T. Single-pressure actuated control system for compressed air spraying of water. 4,591,095, Cl. 239-102.000.

Fanuc Ltd.: *See—*
Isobe, Shinichi; and Sawada, Kazuo, 4,591,770, Cl. 318-565.000.
Nozawa, Ryoichiro; Nagamine, Tsuyoshi; Kawamura, Hideaki; and Fujibayashi, Kentaro, 4,591,771, Cl. 318-569.000.
Nozawa, Ryoichiro; Kawamura, Hideaki; and Miyata, Mitsuto, 4,591,968, Cl. 364-167.000.
Nozawa, Ryoichiro; and Kiya, Nobuyuki, 4,591,990, Cl. 364-474.000.

Farber, Bruce W.: *See—*
Sines, Randy D.; and Farber, Bruce W., 4,591,165, Cl. 273-73.00D.

Farley, Brian S.: *See—*
Jessop, Anthony; Catchpole, Richard J.; Dyke, Peter J.; and Farley, Brian S., 4,592,068, Cl. 375-3.000.

Faublas, Serge: *See—*
Pinede, Edouard; and Faublas, Serge, 4,591,671, Cl. 179-175.20R.

Faupel, Werner; and Hofer, Gerald, to Robert Bosch GmbH. Fuel injection pump. 4,590,913, Cl. 123-502.000.

Fawn Engineering Corp.: *See—*
Wirstlin, Arthur N., 4,591,070, Cl. 221-129.000.

Fedeli, Jean M.; Jouve, Hubert; Magnin, Joel; and Pisella, Christian, to Commissariat a l'Energie Atomique. Magnetic bubble memory. 4,592,017, Cl. 365-19.000.

Federal Cartridge Corporation: *See—*
Proulx, Richard W.; and Kent, Stephen J., 4,590,840, Cl. 86-10.000.

Fehse, Wigbert: *See—*
Guenther, Hans-Jurgen; Nauck, Joachim; Renner, Udo; and Fehse, Wigbert, 4,591,116, Cl. 244-168.000.

Feigenblatt, Nathan, Jr.; and Spector, George. Battery operated panic alarm wrist watch. 4,591,836, Cl. 340-574.000.

Feight, Robert A.: *See—*
Wagner, William R.; and Feight, Robert A., 4,591,534, Cl. 428-593.000.

Feniou, Claude: *See—*
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; Mosser, Jacqueline; and Pontagnier, Henri, 4,591,600, Cl. 514-456.000.

Ferenc, James J., to AT&T Information Systems Inc. Apparatus and method for checking time slot integrity of a switching system. 4,592,044, Cl. 370-13.000.

Fergason, James L., to Manchester R & D Partnership. Enhanced scattering in voltage sensitive encapsulated liquid crystal with spaced apart absorber. 4,591,233, Cl. 350-334.000.

Fergg, Berthold, to Agfa-Gevaert Aktiengesellschaft. Photographic roller copying device. 4,591,263, Cl. 355-43.000.

Ferrin, Clifford A., Jr.: *See—*
Kang, Uan G.; Bush, Richard W.; Ketley, Arthur D.; and Ferrin, Clifford A., Jr., 4,591,522, Cl. 428-419.000.

Ferris, Fred O., III; and Prival, Harri G., to Sperry Corporation. Input-/output system and method for digital computers. 4,591,973, Cl. 364-200.000.

Ferris, Timothy A.; Fortescue, Stephen M.; and Palombo, Gaston, to Dataproducts Corporation. High performance incremental motion system using a closed loop stepping motor. 4,591,774, Cl. 318-696.000.

F'Geppert, Erwin, to United States of America, Army. Inertia transmission. 4,590,813, Cl. 74-64.000.

Fichtel & Sachs AG: *See—*
Schraut, Alfred; and Weissenberger, Helmuth, 4,591,040, Cl. 192-106.200.

Fiel, Christine J. K. Garment. 4,590,945, Cl. 128-455.000.

Fielding, Alan: *See—*
Bricheno, Terry; Fielding, Alan; and Hewish, Nicholas A., 4,591,372, Cl. 65-4.200.

Fietta, Emilio: *See—*
Sanvito, Roberto; Fietta, Emilio; and Della Torre, Giancarlo, 4,590,875, Cl. 112-168.000.

Figgie International Corporation: *See—*
McGill, Robert W., 4,590,744, Cl. 53-497.000.

Figueroa, David S.; and Heredia, Jorge A. P., to Vitro Tec Fideicomiso. Control-valve system and block for a fluid-operated cylinder-and-piston assembly. 4,590,966, Cl. 137-596.170.

Finke, Robert-Gunter; Schumacher, Clemens; Kolb, Albert; Lautenschlager, Horst; and Konetzka, Jurgen, to Robert Finke Kommanditgesellschaft. Two-component package. 4,591,050, Cl. 206-222.000.

Finn, Charles A. Barrel bypass system—full length groove. 4,590,698, Cl. 42-78.000.

Firestone Tire & Rubber Company, The: *See—*
Beattie, Joanne L.; and Cole, William M., 4,591,631, Cl. 528-930.000.
Hall, James E., 4,591,624, Cl. 526-177.000.

First Inertia Switch Limited: *See—*
Jackman, Peter R.; and Stratton, Paul P., 4,591,676, Cl. 200-61.45M.
Fischer, Edgar; and Voelskow, Hartmut, to Hoechst Aktiengesellschaft. Microbial polysaccharide amine adducts. 4,591,639, Cl. 536-114.000.
Fischer, William C.; Wright, Stuart C.; and Verzella, David J., to United Technologies Corporation. Outer-loop monitor for aircraft automatic flight control system. 4,592,055, Cl. 371-62.000.
Fisher, Brian; and Westmoreland, Raymond R. Detector responsive fluid actuated auxiliary braking system. 4,591,019, Cl. 180-275.000.
Fisher, Harrold, to Cubic Corporation. Process camera adapter. 4,591,251, Cl. 354-159.000.
Flemming, Gunter: *See—*
Scholz, Heinrich; and Flemming, Gunter, 4,590,986, Cl. 164-448.000.
Fling, Russell T.; and Willis, Donald H., to RCA Corporation. Digital-to-analog conversion system as for use in a digital TV receiver. 4,591,832, Cl. 340-347.0DA.
Floessel, Carl D.: *See—*
Czech, Franz; and Floessel, Carl D., 4,591,655, Cl. 174-22.00C.
Florio, Joseph J.: *See—*
Mann, Brian M.; and Florio, Joseph J., 4,590,944, Cl. 128-419.0PG.
FloScan Instrument Co., Inc.: *See—*
Baatz, Wilfried, 4,590,796, Cl. 73-113.000.
Flosi, Corrado; and Maccioni, Roberto. Chest protector. 4,590,621, Cl. 2-2.000.
Flowers, James W., Jr.: *See—*
Steele, James H., Jr.; Heckler, Alan J.; Flowers, James W., Jr.; and Powley, George S., 4,591,395, Cl. 148-12.00D.
Fluid Power Components, Inc.: *See—*
Budzich, Tadeusz, 4,591,433, Cl. 210-114.000.
Flynn, Cormack: *See—*
Rohr, Martin; and Flynn, Cormack, 4,590,953, Cl. 131-276.000.
FMC Corporation: *See—*
Brown, Richard A.; and Norris, Robert D., 4,591,443, Cl. 210-747.000.
Fogg, Sidney G.; and Robertson, Frank C., to British Petroleum Company p.l.c., The. Copolymer, a film forming composition and a method of coating a surface with the composition. 4,591,620, Cl. 525-328.800.
Fogg, Sidney G.: *See—*
Aldred, Alan C. G.; and Fogg, Sidney G., 4,591,615, Cl. 525-179.000.
Fohler, Johann: *See—*
Smejkal, Hellmuth; Rockenschaub, Walter; and Fohler, Johann, 4,591,134, Cl. 266-135.000.
Foilpleat Insulation Company, Inc.: *See—*
Ghahremani, A. Moayed; and Singleton, E. Freel, 4,590,727, Cl. 52-406.000.
Foley, Henry C.; and O'Toole, Michael P., to American Cyanamid Company. Catalyst of molybdenum on wide-pore carbon support. 4,591,578, Cl. 502-185.000.
Foley, James W., to Polaroid Corporation. Photographic products and processes. 4,591,628, Cl. 548-146.000.
Follows, Gordon W.; Hart, Christopher G.; and Massey, John, to Imperial Chemical Industries PLC. Process for remelting polyamides. 4,591,468, Cl. 264-40.100.
Fong, Daniel D.: *See—*
Lim, Sam K.; Fong, Daniel D.; and Stoner, Eugene A., 4,591,284, Cl. 400-691.000.
Food Machinery Sales, Inc.: *See—*
Hardage, Timothy W., 4,590,743, Cl. 53-446.000.
Ford Aerospace & Communications Corporation: *See—*
Chan, Fred N., 4,591,118, Cl. 244-171.000.
Ford Motor Company: *See—*
Kaiser, William J.; and Logothetis, Eleftherios M., 4,591,417, Cl. 204-192.00R.
Foresight Enterprises Inc.: *See—*
Peterson, Steven H.; Berg, Bernard J.; and Bowden, David R., 4,591,978, Cl. 364-200.000.
Fort, Edward S., to Fort Vale Engineering Limited. Valves. 4,590,959, Cl. 137-315.000.
Fort Vale Engineering Limited: *See—*
Fort, Edward S., 4,590,959, Cl. 137-315.000.
Fortec, Inc.: *See—*
Jeanson, Richard L.; and Olson, John B., 4,591,187, Cl. 281-45.000.
Fortenberry, Robert S.: *See—*
Broockman, Eric C.; and Fortenberry, Robert S., 4,591,236, Cl. 350-3.710.
Fortescue, Stephen M.: *See—*
Ferris, Timothy A.; Fortescue, Stephen M.; and Palombo, Gaston, 4,591,774, Cl. 318-696.000.
Fortnagel, Manfred, to Daimler-Benz AG. Throttling-pintle nozzle for fuel injection in an internal-combustion engine. 4,591,101, Cl. 239-533.120.
Fosnacht, Donald R.; and Tindyala, Masood A., to Inland Steel Company. Fluid flow control structure for tundish. 4,591,135, Cl. 266-275.000.
Foster, Robert W.; Lottes, Rosanna M.; and Swinehart, Grant E., to AT&T Bell Laboratories. Method and apparatus for providing call tracing service. 4,591,665, Cl. 179-18.0FH.
Foulkes, Thomas L., to NIS Engineering Limited. Welding and laying pipelines. 4,591,294, Cl. 405-170.000.
Foundation Control Systems: *See—*
Murray, Clarence L.; and Bright, John T., 4,591,466, Cl. 264-35.000.
Fournie, Rene ; and Besnard, Francois, to Societe Nationale Elf Aquitaine (Production). Mechanical coupling device for immersed pipelines. 4,591,191, Cl. 285-18.000.
Foy, Dennis M. Foldable container assembly. 4,591,065, Cl. 220-7.000.
Fradenburgh, Evan A.; Kiely, Edmond F.; and Miller, Gordon G., to United Technologies Corporation. Method of forming a fiber reinforced composite article of a complex configuration. 4,591,400, Cl. 156-80.000.
Framatome & Cie: *See—*
Beaubatie, Jean; Cavarec, Francois; Lenclos, Jean-Francois; and Paris, Marc, 4,590,797, Cl. 73-295.000.
Frasch, Eugene W., to Kulicke and Soffa Industries Inc. Apparatus for making rolling spot bonds. 4,591,087, Cl. 228-110.000.
Freeborn, John O.: *See—*
Olsen, William L.; Freeborn, John O.; Shaver, Linnea J.; and Kelemen, Janice J., 4,591,485, Cl. 422-20.000.
Freeman, Michael. Multichannel interactive telephone answering apparatus. 4,591,664, Cl. 179-6.060.
Freeman, Michael J. Dynamic audience responsive movie system. 4,591,248, Cl. 352-133.000.
Freilich, Arthur H. Aggregometer electrode structures. 4,591,793, Cl. 324-446.000.
Freno, Helen; and Freno, John S. Three dimensional fabric design. 4,591,521, Cl. 428-78.000.
Freno, John S.: *See—*
Freno, Helen; and Freno, John S., 4,591,521, Cl. 428-78.000.
Fritsch, Rudolf P. Method and apparatus for the continuous production of high-molecular polymers. 4,591,487, Cl. 422-134.000.
Fritsche, Karl; and Vahs, Wilhelm, to Geze GmbH. Door closer. 4,590,639, Cl. 16-79.000.
Frizlen, Hans-Jorg, to Telefonaktiebolaget LM Ericsson. Activation in a digital subscriber connection. 4,592,051, Cl. 370-103.000.
Fuchs, Gerhard; Ehle, Joachim; and Heinzelmann, Hans-Peter, to Fuchs Systemtechnik GmbH. Metallurgical vessel, in particular an electric arc furnace. 4,592,067, Cl. 373-83.000.
Fuchs Systemtechnik GmbH: *See—*
Fuchs, Gerhard; Ehle, Joachim; and Heinzelmann, Hans-Peter, 4,592,067, Cl. 373-83.000.
Fuji Electric Company, Ltd.: *See—*
Funyu, Yutaka; Okumura, Tadashi; Monno, Asao; and Shimizu, Masami, 4,590,658, Cl. 29-464.000.
Fuji, Masaaki; Izumi, Yuichi; and Kitaguchi, Hiroshi, to Hitachi, Ltd. Method of measuring radioactivity. 4,591,720, Cl. 250-362.000.
Fuji Photo Co., Ltd.: *See—*
Goto, Chiaki; Horikawa, Kazuo; and Noguchi, Masaru, 4,591,714, Cl. 250-327.200.
Fuji Photo Film Co., Ltd.: *See—*
Goto, Chiaki, 4,591,715, Cl. 250-327.200.
Nakamura, Kiyoji, 4,591,239, Cl. 350-254.000.
Outsuka, Shuichi; and Kimura, Akinori, 4,591,543, Cl. 430-125.000.
Takano, Masao; and Asai, Eiichi, 4,591,922, Cl. 358-280.000.
Urabe, Hitoshi; Matsumoto, Masayuki; Kudo, Hisashi; and Shimazaki, Osamu, 4,591,904, Cl. 358-75.000.
Urabe, Hitoshi; and Kimura, Hideaki, 4,591,923, Cl. 358-284.000.
Fuji Standard Research, Inc.: *See—*
Gomi, Shimpei; Arai, Tomio; Mogi, Fumio; Nakagawa, Takao; Miura, Kunio; and Otani, Sugio, 4,591,424, Cl. 208-40.000.
Fuji Xerox Co., Ltd.: *See—*
Noguchi, Akio, 4,591,905, Cl. 358-75.000.
Shiratsuki, Yoshiyuki, 4,591,877, Cl. 346-76.0PH.
Fujibayashi, Kentaro: *See—*
Nozawa, Ryoichiro; Nagamine, Tsuyoshi; Kawamura, Hideaki; and Fujibayashi, Kentaro, 4,591,771, Cl. 318-569.000.
Fujie, Shunji: *See—*
Okabe, Jiro; Fujie, Shunji; and Takeuchi, Haruki, 4,590,784, Cl. 72-389.000.
Fujii, Masaaki: *See—*
Kitaguchi, Hiroshi; and Fujii, Masaaki, 4,591,716, Cl. 250-336.100.
Fujii, Tadashi: *See—*
Ishizaka, Hideo; and Fujii, Tadashi, 4,592,000, Cl. 364-557.000.
Fujii, Yasuhiro: *See—*
Takemae, Yoshihiro; Ogawa, Junji; Fujii, Yasuhiro; Nakano, Tomio; Tatematsu, Takeo; Horii, Takashi; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,592,025, Cl. 365-200.000.
Fujikawa, Kuniyoshi: *See—*
Tanabe, Takeshi; Fujikawa, Kuniyoshi; Yasuda, Takatoshi; and Takeoka, Nobuo, 4,591,684, Cl. 219-10.55B.
Fujikawa, Tetsuzo; and Shinichi, Tamba, to Kawasaki Jukogyo Kabushiki Kaisha. Engine cooling system in field machinery. 4,590,891, Cl. 123-41.110.
Fujimaki, Yoshihide; Kudo, Koichi; Takei, Yoshiaki; and Nomori, Hiroyuki, to Konishiroku Photo Industry Co., Ltd. Light-sensitive member and preparation thereof for use in electrophotography. 4,591,542, Cl. 430-59.000.
Fujimori, Akiyoshi: *See—*
Fuse, Yoshiro; Naganuma, Takao; Fujimori, Akiyoshi; Arai, Kozo; Igarashi, Katsutoshi; and Naito, Yuzi, 4,591,724, Cl. 250-492.100.
Fujimori, Ryo: *See—*
Banno, Taiichi; Fujimori, Ryo; Takekawa, Hiroshi; and Hijikata, Kazuo, 4,591,568, Cl. 436-180.000.
Fujimura, Fumio: *See—*
Satake, Toshimi; Minami, Toshiaki; and Fujimura, Fumio, 4,591,888, Cl. 346-209.000.
Fujimura, Itaru: *See—*
Oseto, Seiichi; Fujimura, Itaru; and Nakamura, Hitoshi, 4,591,262, Cl. 355-14.0CH.

Fujisawa Pharmaceutical Co., Ltd.: *See*—
Ueda, Ikuo; Morino, Daizo; and Takimoto, Koichi, 4,591,590, Cl. 514-252.000.
Fujita, Masafumi: *See*—
Ueda, Nobuo; and Fujita, Masafumi, 4,591,264, Cl. 355-68.000.
Fujitsu Limited: *See*—
Asagi, Yasuyoshi; Ogawa, Noriaki; Kasai, Hitoshi; Hattori, Toshihiro; Ishihara, Masaki; and Uriuhara, Makoto, 4,591,038, Cl. 192-0.073.
Goto, Hiroshi, 4,590,666, Cl. 29-578.000.
Ito, Akihiko; and Saito, Tadahiro, 4,591,895, Cl. 357-42.000.
Iwasa, Seiichi, 4,592,052, Cl. 371-21.000.
Shimizu, Shokichi; Aoki, Hideji; Kida, Susumu; and Kanazawa, Yuki, 4,590,672, Cl. 29-827.000.
Takemae, Yoshihiro; Nakano, Tomio; and Sato, Kimiaki, 4,592,020, Cl. 365-189.000.
Takemae, Yoshihiro; Ogawa, Junji; Fujii, Yasuhiro; Nakano, Tomio; Tatematsu, Takeo; Horii, Takashi; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,592,025, Cl. 365-200.000.
Fujiwara, Akihiro: *See*—
Kaneda, Naoya; Toyama, Masamichi; Kozuki, Susumu; Kohtani, Yutaka; and Fujiwara, Akihiro, 4,591,919, Cl. 358-227.000.
Fukaya, Chikara: *See*—
Yokoyama, Kazumasa; Fukaya, Chikara; Isuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,591,593, Cl. 514-307.000.
Yokoyama, Kazumasa; Fukaya, Chikara; Tsuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,591,599, Cl. 514-413.000.
Fukuda, Hironori: *See*—
Kobayashi, Tadahiko; Sahashi, Masashi; Inomata, Koichiro; Domon, Tomokazu; and Fukuda, Hironori, 4,590,807, Cl. 73-862.360.
Fukuda, Keiji: *See*—
Umeno, Masaki; Fukuda, Keiji; and Onoe, Yasumitsu, 4,591,133, Cl. 266-114.000.
Fukuhara, Hiroshige, to Nissan Motor Company, Limited. Loran-C receiver. 4,591,860, Cl. 343-390.000.
Fukui, Noboru: *See*—
Tamba, Shinichi; and Fukui, Noboru, 4,590,890, Cl. 123-41.700.
Fukumori, Kenichi; and Kamimura, Katsumi, to Japan Speed Shore Co., Ltd. Expansion beam for shoring up sand guards. 4,591,298, Cl. 405-282.000.
Fukuoka, Hiromi; Asano, Keisuke; and Ide, Hideo, to Nippon Steel Corporation. Method and apparatus for supplying molten metal in the manufacture of amorphous metal ribbons. 4,590,988, Cl. 164-463.000.
Fukushima, Isao: *See*—
Miura, Kuniaki; Kobori, Yasunori; Fukushima, Isao; Shiomi, Makoto; and Kano, Kenji, 4,591,798, Cl. 329-102.000.
Miura, Kuniaki; Okada, Yoshinori; Fukushima, Isao; and Tamura, Teizo, 4,591,924, Cl. 358-330.000.
Fukuura, Yukio: *See*—
Naito, Kazuo; Fuse, Tadashi; Tanuma, Itsuo; Fukuura, Yukio; and Ishikawa, Hikaru, 4,591,618, Cl. 525-279.000.
Fulton, Donald S.: *See*—
Jarvis, Michael R.; and Fulton, Donald S., 4,591,838, Cl. 340-605.000.
Funai, Hiroshi: *See*—
Matsuki, Ikuo; Kamiya, Naoyuki; Ikeda, Toshimitsu; Takagi, Yoshiari; Iizuka, Yoshio; Yamaguchi, Yoshinobu; Funai, Hiroshi; Terasawa, Mutsumi; and Tasaka, Susumu, 4,590,905, Cl. 123-321.000.
Fundneider, Oswald, to Siemens Aktiengesellschaft. Circuit for the subscriber termination in an integrated services digital network. 4,592,045, Cl. 370-58.000.
Fundneider, Oswald, to Siemens Aktiengesellschaft. Circuit for the subscriber termination in an integrated services digital network. 4,592,047, Cl. 370-58.000.
Funyu, Yutaka; Okumura, Tadashi; Monno, Asao; and Shimizu, Masami, to Fuji Electric Company, Ltd. Tube wall thickness measurement. 4,590,658, Cl. 29-464.000.
Furman, Herbert, to General Motors Corporation. Modular window assembly. 4,591,203, Cl. 296-201.000.
Furmanski, Walery, to Dynapac AB. Measuring apparatus for measuring the degree of compaction of a material. 4,590,802, Cl. 73-573.000.
Furuya, Tsuneo; and Inazawa, Yoshizumi, to Sony Corporation. Disc player with search noise suppression. 4,592,036, Cl. 369-32.000.
Fuse, Tadashi: *See*—
Naito, Kazuo; Fuse, Tadashi; Tanuma, Itsuo; Fukuura, Yukio; and Ishikawa, Hikaru, 4,591,618, Cl. 525-279.000.
Fuse, Yoshiro; Naganuma, Takao; Fujimori, Akiyoshi; Arai, Kozo; Igarashi, Katsutoshi; and Naito, Yuzi, to Japan Synthetic Rubber Co., Ltd.; and ORC Manufacturing Co., Ltd. Curing apparatus. 4,591,724, Cl. 250-492.100.
G-C Dental Industrial Corp.: *See*—
Akahane, Shoji; Hirota, Kazuo; and Tomioka, Kentaro, 4,591,384, Cl. 106-35.000.
Hirasawa, Tadashi; and Harashima, Ikuro, 4,591,649, Cl. 549-232.000.
Gaebelein, Georg, deceased (by Gaebelein, Gertrud S., executor); Bhend, Richard B.; Keillor, Robert D.; Lovgren, Jeffrey L.; and Mercer, John R., to International Business Machines Corporation. Solid state scanner for a variable speed transport. 4,591,727, Cl. 250-578.000.
Gaebelein, Gertrud S.; executor: *See*—
Gaebelein, Georg, deceased; Bhend, Richard B.; Keillor, Robert D.; Lovgren, Jeffrey L.; and Mercer, John R., 4,591,727, Cl. 250-578.000.
Galan Inchaurbe, Jose M. J. Spacial structure. 4,591,286, Cl. 403-170.000.
Galan, Louis: *See*—
Accetta, Joseph S.; Galan, Louis; Hamilton, Patrick D.; and Amick, James L., 4,592,063, Cl. 372-58.000.
Galiasso, Roberto E.: *See*—
Krasuk, Julio H.; Silva, Fernando J.; Galiasso, Roberto E.; and Souto, Alfredo, 4,591,426, Cl. 208-96.000.
Galipag: *See*—
Gasser, Hermann, 4,590,646, Cl. 19-262.000.
Gallardo, Manuel A.: *See*—
Meyer, Jean; and Gallardo, Manuel A., 4,591,273, Cl. 366-288.000.
Gallitzendoerfer, Joseph; Pfeiffer, Peter; Tomforde, Johann; and Hellhake, Ferdinand, to Daimler-Benz Aktiengesellschaft. Structure for an automotive vehicle body. 4,591,204, Cl. 296-202.000.
Ganguli, Keshab L.: *See*—
Lok, Cornelis M.; and Ganguli, Keshab L., 4,591,579, Cl. 502-244.000.
Gao Gessellschaft fur Automation und Organisation mbH: *See*—
Stenzel, Gerhard; and Kaule, Wittich, 4,591,707, Cl. 235-493.000.
Garber, John L., to Dynachem Corporation. Automatic laminator with integrated printer buffer/interface. 4,591,406, Cl. 156-484.000.
Garcia, Jose . Circuit for controlling the stopping of equipment. 4,591,731, Cl. 307-132.00R.
Gardner, Elmer W., Jr. Hot gas engine and vehicle drive system. 4,590,767, Cl. 60-668.000.
Gardner, William N.; and Rohde, Kenneth R., to Combustion Engineering Co., Inc. Method of and apparatus for determining the position of a movable member. 4,590,963, Cl. 137-554.000.
Garfinkle, Benjamin L., to Clamp Swing Pricing Co. Deli tag molding. 4,591,057, Cl. 211-59.100.
Garner, John N., to Northern Telecom Limited. Low fatigue apparatus for stranding wire. 4,590,755, Cl. 57-293.000.
Garthus, Donald R., to Interlake, Inc. Apparatus for mixing pulverulent material on a conveyor belt. 4,591,275, Cl. 366-349.000.
Gas Research Institute: *See*—
Birchmeier, John R.; Ruck, George T.; Thompson, Neil G.; and Barlo, Thomas J., 4,591,792, Cl. 324-425.000.
Gasc, Jean-Claude; Humbert, Daniel; and Hunt, Peter F., to Roussel Uclaf. 2-aryl pyrazolo[4,3-c]cinnolin-3-ones. 4,591,589, Cl. 514-248.000.
Gaset, Antoine: *See*—
Delmas, Michel; Gaset, Antoine; and Le Bigot, Yves, 4,591,651, Cl. 549-473.000.
Gaskell, David J.; and Stevens, John W., to Lucas Industries. Injection nozzle. 4,591,100, Cl. 239-533.300.
Gaskell, Philip S.; Lagadec, Roger; and McNally, Guy W. W., to Willi Studer AG. Technique for editing interleaved digital audio data. 4,591,926, Cl. 360-13.000.
Gasser, Hermann, to Galipag. Aspirator systems. 4,590,646, Cl. 19-262.000.
Gausmann, Eric J.: *See*—
Beckner, Mark W.; Davis, James A.; Gausmann, Eric J.; Hiller, Thomas L.; Olson, Philip D.; and Van Dine, Gilbert A., 4,592,048, Cl. 370-60.000.
Gauthier, Robert E.; and Susser, Mark, to Ex-Cell-O Corporation. Permanent magnet rotor with interfit cage structure. 4,591,749, Cl. 310-156.000.
Gay, Benjamin A. Automatic doffing method. 4,591,106, Cl. 242-18.00G.
Gazzi, Luigi; D'Ambra, Roberto; Di Cintio, Roberto; Rescalli, Carlo; and Vetere, Alessandro, to Snamprogetti, S.p.A. Cryogenic process for removing acid gases from gas mixtures by means of a solvent. 4,591,370, Cl. 62-17.000.
Gebr. Happich GmbH: *See*—
Majchrzak, Roland, 4,591,956, Cl. 362-144.000.
Geiger, Reinold. Flask closure system. 4,591,063, Cl. 215-330.000.
Geis, Timothy R.: *See*—
Koos, William M., Jr.; Geis, Timothy R.; and Rudy, Richard M., Jr., 4,591,846, Cl. 340-748.000.
Gelbard, Edward, to Wilverly Mansions I.B.V. Apparatus for folding sheet materials. 4,591,354, Cl. 493-439.000.
Gelsen, Karl-Heinz: *See*—
Jansen, Hansjurgen; and Gelsen, Karl-Heinz, 4,591,729, Cl. 307-116.000.
General Corporation, The: *See*—
Hoshino, Akichika; and Honzi, Youichi, 4,590,773, Cl. 62-333.000.
General Dynamics Pomona Division: *See*—
Long, Stuart G.; and Maciocia, Michael J., 4,590,741, Cl. 53-427.000.
General Electric Company: *See*—
Ades, Adrian R.; and Schmidt, George S., 4,590,653, Cl. 29-156.80R.
Chalek, Carl L.; and Johnson, Peter D., 4,591,759, Cl. 313-638.000.
Germer, Warren R., 4,591,782, Cl. 324-103.00R.
Glover, Gary H.; and Pelc, Norbert J., 4,591,789, Cl. 324-307.000.
Hickin, Charles W. R.; and Austen, Michael D., 4,591,844, Cl. 340-728.000.
Highton, Frederick J., 4,591,805, Cl. 330-294.000.
Laughton, William J., 4,591,734, Cl. 307-248.000.

Sullivan, Jack O., 4,590,828, Cl. 82-24.00R.
West, Paul R.; and Griffing, Bruce F., 4,591,546, Cl. 430-270.000.
Willard, Henry G.; and Anderson, Thomas E., 4,591,942, Cl. 361-97.000.

General Instrument Corporation: *See—*
Brownell, Terry, 4,591,547, Cl. 430-312.000.
Nickels, Richard C., Jr.; and Allgaier, Richard L., Jr., 4,590,853, Cl. 101-93.480.
Simon, Ralph E., 4,590,667, Cl. 29-589.000.

General Motors Corporation: *See—*
Beardmore, John M., 4,590,964, Cl. 137-565.000.
Furman, Herbert, 4,591,203, Cl. 296-201.000.
Matthews, Charles C., 4,591,016, Cl. 180-165.000.

Genes' Enterprise Corp.: *See—*
Mortvedt, Eugene S.; and Boster, Eugene M., 4,591,178, Cl. 280-154.000.

Gentischer, Josef: *See—*
Illig, Egon; Gentischer, Josef; and Schmutz, Wolfgang, 4,591,140, Cl. 271-11.000.

Georg Fischer Aktiengesellschaft: *See—*
Wehrmann, Gerhard, 4,590,636, Cl. 15-94.000.

George, John A. Ventilation heat recovery system. 4,590,990, Cl. 165-54.000.

George, Stephen; and George, Thomas H., to Subtex, Inc. Inorganic binder composition and refractory-binder coated fabric compositions prepared therefrom. 4,591,516, Cl. 427-375.000.

George, Thomas H.: *See—*
George, Stephen; and George, Thomas H., 4,591,516, Cl. 427-375.000.

Gerber Scientific Products, Inc.: *See—*
Logan, David J., 4,591,999, Cl. 364-523.000.

Gerbruder Buhler AG: *See—*
Oetiker, Hans; and Kummer, Emanuel, 4,590,795, Cl. 73-73.000.

Gerhard, Helmut, to Westerwaelder Eisenwerk Gerhard GmbH. Freight container. 4,591,064, Cl. 220-1.500.

Gerin, Merlin: *See—*
Vasseur, Andre , 4,591,228, Cl. 339-198.00H.

Germer, Warren R., to General Electric Company. Power supply and power monitor for electric meter. 4,591,782, Cl. 324-103.00R.

Gerster, Thomas, to Keramik Holding AG Laufen. Process for the preparation of blanks. 4,591,472, Cl. 264-87.000.

Gertzman, Arthur; and Thompson, Darrell R., to Ethicon, Inc. Annealed polydioxanone surgical device and method for producing the same. 4,591,630, Cl. 528-503.000.

Geze GmbH: *See—*
Fritsche, Karl; and Vahs, Wilhelm, 4,590,639, Cl. 16-79.000.

Ghahremani, A. Moayed; and Singleton, E. Freel, to Foilpleat Insulation Company, Inc. Reflective insulation blanket with retaining clips. 4,590,727, Cl. 52-406.000.

Gibson-Egan Company: *See—*
Alemanni, James C., 4,591,053, Cl. 206-331.000.

Gien, Bernard L. Pneumatic percussion machine. 4,591,004, Cl. 173-17.000.

Gildemeister-Devlieg System-Werkzeuge GmbH: *See—*
Westerteicher, Wolfgang; and Schurfeld, Horst, 4,591,306, Cl. 409-179.000.

Gill, Jeffrey I.: *See—*
Steed, Ivan V.; and Gill, Jeffrey I., 4,590,883, Cl. 116-173.000.

Gillhaus, Horst, to Ruhrgas Aktiengesellschaft. Heat treatment furnace with crown-shaped transport path for the workpieces. 4,591,337, Cl. 432-138.000.

Giltzow, J. Hunter, to Ketcham & McDougall, Inc. Multi-range weight scale. 4,591,013, Cl. 177-230.000.

Gimeno, Rene: *See—*
Huc, Alain; Gimeno, Rene; and Herbage, Daniel, 4,591,456, Cl. 530-356.000.

Giulini Chemie GmbH: *See—*
Hechler, Erwin, 4,591,412, Cl. 162-158.000.

Givaudan Corporation: *See—*
Rohr, Martin; and Flynn, Cormack, 4,590,953, Cl. 131-276.000.

Gleisner, Donald: *See—*
Wolfe, Robert A.; and Gleisner, Donald, 4,590,622, Cl. 2-2.000.

Glover, Gary H.; and Pelc, Norbert J., to General Electric Company. Method for correcting image distortion due to gradient nonuniformity. 4,591,789, Cl. 324-307.000.

Glyco Metall-Werke Daelen & Hofmann KG: *See—*
Hodes, Erich; Lippok, Peter; and Miotk, Bernd, 4,591,536, Cl. 428-643.000.

GMF Robotics Corporation: *See—*
Gravel, David P., 4,591,944, Cl. 361-170.000.

Gobrecht, Jens: *See—*
Neidig, Arno; Bunk, Klaus; Thiele, Karl-Heinz; Wahl, Georg; and Gobrecht, Jens, 4,591,401, Cl. 156-89.000.

Godfrey, Daniel R. Weight lifting calf equalizer exercising machine. 4,591,149, Cl. 272-118.000.

Godlewski, Edward S. Feeder for press. 4,591,144, Cl. 271-246.000.

Goebel, Konrad; Muller, Rainer; and Schiffers, Ulrich, to Kraftwerk Union Aktiengesellschaft. Medium-load power generating station with an integrated coal gasification plant. 4,590,760, Cl. 60-39.120.

Goedhart, Machiel; Gortemaker, Franciscus H.; Kemper, Hermanus C.; and Kielman, Hendrik S., to Lever Brothers Company. Dishwashing compositions. 4,591,448, Cl. 252-99.000.

Goedhart, Machiel; Gortemaker, Franciscus H.; Kemper, Hermanus C.; and Kielman, Hendrik S., to Lever Brothers Company. Dishwashing composition. 4,591,449, Cl. 252-99.000.

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Vossieck, Paul; and vom Stein, Karl, 4,591,167, Cl. 277-88.000.

Goldfarb, Adolph E.; Everitt, Delmar K.; and Burger, Norman J., to Goldfarb, Adolph E. Wheeled miniature toy vehicle with control element that is squeeze-operated at sides. 4,591,347, Cl. 446-462.000.

Goldstein, Shyke A.: *See—*
Sohval, A. Robert; Cooperstein, Gerald; Goldstein, Shyke A.; and Hearn, David R., 4,592,079, Cl. 378-9.000.

Goldstein, Yeshayahu S. A.; and Tidman, Derek A., to GT-Devices. Method of and apparatus for accelerating a projectile. 4,590,842, Cl. 89-8.000.

Golledge, Ian: *See—*
Bradshaw, Thomas H.; Golledge, Ian; and Pike, John V., 4,591,123, Cl. 248-349.000.
Bryant-Jeffries, Keith C.; Golledge, Ian; Pike, John V.; and Vaughan, Eric V., 4,591,120, Cl. 248-179.000.

Gomi, Shimpei; Arai, Tomio; Mogi, Fumio; Nakagawa, Takao; Miura, Kunio; and Otani, Sugio, to Fuji Standard Research, Inc. Method of preparing carbonaceous pitch. 4,591,424, Cl. 208-40.000.

Gooden, Eldon D. Process for packaging leaf tobacco. 4,590,954, Cl. 131-299.000.

Goodman, R. W.: *See—*
Wade, Donald A.; Wagner, Eric M.; Krantz, Lawrence L.; and Goodman, R. W., 4,591,975, Cl. 364-200.000.

Goodwin, Henry W.: *See—*
Arbree, Roberta R.; Degulis, David C.; Goodwin, Henry W.; and Veillette, Norman T., 4,591,887, Cl. 346-200.000.

Gordon, Michael; and Curreri, John R., to Christian Dior, S.A.; and Koret, Inc. Luggage carrier. 4,591,183, Cl. 280-655.000.

Gordon, Robert T. Use of ferromagnetic, paramagnetic and diamagnetic particles in the treatment of infectious diseases. 4,590,922, Cl. 128-1.300.

Gorham International, Inc.: *See—*
Nyce, Andrew C., 4,591,482, Cl. 419-38.000.

Gortemaker, Franciscus H.: *See—*
Goedhart, Machiel; Gortemaker, Franciscus H.; Kemper, Hermanus C.; and Kielman, Hendrik S., 4,591,448, Cl. 252-99.000.
Goedhart, Machiel; Gortemaker, Franciscus H.; Kemper, Hermanus C.; and Kielman, Hendrik S., 4,591,449, Cl. 252-99.000.

Gossard, Arthur C.; and Petroff, Pierre M., to AT&T Bell Laboratories. Superlattice geometry and devices. 4,591,889, Cl. 357-4.000.

Goto, Chiaki; Horikawa, Kazuo; and Noguchi, Masaru, to Fuji Photo Co., Ltd. Light guide member for radiation image read-out. 4,591,714, Cl. 250-327.200.

Goto, Chiaki, to Fuji Photo Film Co., Ltd. Light guide member for radiation image read-out. 4,591,715, Cl. 250-327.200.

Goto, Fumio; and Ogawa, Taro, to Namba Press Works Co., Ltd. Process for preparing structural bodies of granular material. 4,591,470, Cl. 264-59.000.

Goto, Hiroshi, to Fujitsu Limited. Method for producing a bipolar transistor having a reduced base region. 4,590,666, Cl. 29-578.000.

Goto, Sumio: *See—*
Matsubara, Toru; Iimura, Ikuro; Sakuma, Kuniharu; and Goto, Sumio, 4,590,879, Cl. 112-278.000.

Goto, Syunsuke: *See—*
Ohtsubo, Takashi; Kawase, Hirahisa; and Goto, Syunsuke, 4,590,809, Cl. 73-863.530.

Grabarek, Chester; and Collis, Dave L., to United States of America, Army. Projectile pusher-type discarding sabot. 4,590,862, Cl. 102-522.000.

Grabasch, Heinz: *See—*
Mencke, Helmut; Gruner, Hans-Jurgen; Oertmann, Peter; Nerlich, Horst; and Grabasch, Heinz, 4,590,876, Cl. 112-262.300.

Grabel, Vernon, to Polaroid Corporation. Method of storing and printing image with non-reentrant basic disk operating system. 4,591,997, Cl. 364-519.000.

Graf & Cie AG: *See—*
Graf, Ralph, 4,590,645, Cl. 19-114.000.

Graf, Ralph, to Graf & Cie AG. Card clothing for carding machines. 4,590,645, Cl. 19-114.000.

Grant, Paul; and Petkiewicz, Chester, to Pellon Corporation. Laminated protective jacket for disc. 4,591,526, Cl. 428-198.000.

Granville, John M. Automatic main seam feeding and forming apparatus. 4,590,871, Cl. 112-142.000.

Granz, Axel: *See—*
Oltmanns, Heinrich; Granz, Axel; Dalhoff, Willi; and Othold, Rolf, 4,591,193, Cl. 285-138.000.

Granz, Bernd: *See—*
Altmann, Franz; Granz, Bernd; Grenda, Dieter; and Oppelt, Ralph, 4,592,029, Cl. 367-7.000.

Gravel, David P., to GMF Robotics Corporation. Electronic circuit for tactile sensors. 4,591,944, Cl. 361-170.000.

Gray, Scarlette M.: *See—*
Dickinson, David J.; and Gray, Scarlette M., 4,591,515, Cl. 427-297.000.

Green Cross Corporation, The: *See—*
Yokoyama, Kazumasa; Fukaya, Chikara; Isuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,591,593, Cl. 514-307.000.
Yokoyama, Kazumasa; Fukaya, Chikara; Tsuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,591,599, Cl. 514-413.000.

Greenwood, David; and Smith, Roger J., to Dynacast International Limited. Injection moulding casting method. 4,591,476, Cl. 264-328.140.

Greer, James B.: *See*—
Kane, Russell D.; Greer, James B.; Jacobs, Dawn F.; and Berkowitz, Barry J., 4,591,393, Cl. 148-11.50N.
Greer, John W. Electronically powered apparatus for imparting vibratory forces on a tree. 4,591,748, Cl. 310-81.000.
Gregor, William T.: *See*—
Sherwood, Michael D.; Gregor, William T.; Snyder, Kenneth D.; El-Kilani, Saddah; and Roth, Richard W., 4,591,704, Cl. 235-380.000.
Gregorich, David P.; and Mocker, Hans W., to Honeywell, Inc. Relaxation oscillator synchronizer for pulsed laser operation. 4,591,761, Cl. 315-170.000.
Gremm, Walter, to Hamm Chemie GmbH. Process for the treatment of hydrochloric acid pickles containing iron and zinc. 4,591,489, Cl. 423-100.000.
Grenda, Dieter: *See*—
Altmann, Franz; Granz, Bernd; Grenda, Dieter; and Oppelt, Ralph, 4,592,029, Cl. 367-7.000.
Greschner, Johann: *See*—
Bohlen, Harald; Bretscher, Erwin; Engelke, Helmut; Nehmiz, Peter; Vettiger, Peter; and Greschner, Johann, 4,591,540, Cl. 430-22.000.
Gretsch-Unitas GmbH Baubeschlage: *See*—
von Resch, Julius M., 4,590,707, Cl. 49-130.000.
Greve, Manfred; and Moser, Helmut, to Sandoz Ltd. Sulfo group-free polyazo compounds containing at least two basic water-solubilizing groups in metal-free or metal complex form. 4,591,635, Cl. 534-612.000.
Griesenbeck, Harrell. Bed tent. 4,590,956, Cl. 135-116.000.
Griffin, William R.; and Heller, Lawrence G., to International Business Machines Corporation. Methodology for making logic circuits. 4,591,993, Cl. 364-491.000.
Griffing, Bruce F.: *See*—
West, Paul R.; and Griffing, Bruce F., 4,591,546, Cl. 430-270.000.
Griffiths, Harold: *See*—
Scott, John E.; and Griffiths, Harold, 4,591,390, Cl. 134-15.000.
Grimberg, Georges S. Composition for improved absorption of 2A cations and gold comprising yeast or Lactobacillus. 4,591,503, Cl. 424-93.000.
Grobicki, Chris J.: *See*—
Nissen, Stanley M.; Grobicki, Chris J.; and Kaupinis, William M., 4,591,977, Cl. 364-200.000.
Groch, Michael E. Organizer for attache cases. 4,591,056, Cl. 206-564.000.
Grollier, Jean F., to L'Oreal. Thickened or gelled composition for conditioning hair. 4,591,610, Cl. 524-55.000.
Grosshauser, Anton: *See*—
Toaspern, Jorg; and Grosshauser, Anton, 4,591,310, Cl. 414-786.000.
Grot, Walther G., to Du Pont de Nemours, E. I., and Company. Ion exchange process and apparatus. 4,591,439, Cl. 210-638.000.
Grotnes Metalforming Systems, Inc.: *See*—
Javorik, Laszlo, 4,590,655, Cl. 29-421.00R.
Gruber, Wolfgang: *See*—
Deneke, Ulfert; Gruber, Wolfgang; and Batz, Hans-Georg, 4,591,553, Cl. 435-16.000.
Gruchalla, Michael E.; and Koller, David C., to EG&G Washington Analytical Services Center Inc. Double insulated protected system providing electrical safety and instrumentation quality power grounding. 4,591,941, Cl. 361-42.000.
Grumman Aerospace Corporation: *See*—
Angeloff, Lloyd G., 4,590,718, Cl. 52-116.000.
Grund, Christian: *See*—
Lemelson, Jerome H.; and Grund, Christian, 4,592,042, Cl. 369-258.000.
Gruner, Hans-Jurgen: *See*—
Mencke, Helmut; Gruner, Hans-Jurgen; Oertmann, Peter; Nerlich, Horst; and Grabasch, Heinz, 4,590,876, Cl. 112-262.300.
GT-Devices: *See*—
Goldstein, Yeshayahu S. A.; and Tidman, Derek A., 4,590,842, Cl. 89-8.000.
GTE Business Communication Systems Inc.: *See*—
Boeckmann, Eduard F. B., 4,591,666, Cl. 179-90.00B.
GTE Communication Products Corporation: *See*—
Blackburn, Tom L., 4,591,855, Cl. 340-870.130.
GTE Communication Systems Corporation: *See*—
Reimer, William A., 4,591,217, Cl. 339-17.0LM.
Reimer, William A., 4,591,218, Cl. 339-17.0LM.
Reimer, William A., 4,591,219, Cl. 339-17.0LM.
GTE Laboratories Incorporated: *See*—
Regan, Robert J.; Butler, Scott J.; and Ben-Aharon, Zvi, 4,591,809, Cl. 331-117.00R.
GTE Products Corporation: *See*—
Mizuhara, Howard, 4,590,901, Cl. 123-193.00P.
Mizuhara, Howard, 4,591,535, Cl. 428-627.000.
GTM Entrepose: *See*—
Augoyard, Jean-Pierre; and Guggemos, Philippe, 4,590,763, Cl. 60-327.000.
Guenther, Hans-Jurgen; Nauck, Joachim; Renner, Udo; and Fehse, Wigbert, to ERNO Raumfahrttechnik GmbH. Attitude control for satellites. 4,591,116, Cl. 244-168.000.
Guggemos, Philippe: *See*—
Augoyard, Jean-Pierre; and Guggemos, Philippe, 4,590,763, Cl. 60-327.000.
Guichard, Francoise: *See*—
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; Mosser, Jacqueline; and Pontagnier, Henri, 4,591,600, Cl. 514-456.000.
Gulf & Western Manufacturing Company: *See*—
Charboneau, Ben J.; and Zerod, Richard D., 4,591,839, Cl. 340-620.000.
Gunderson, Jon; Kelso, David P.; and Vanderheiden, Gregg, to Wisconsin Alumni Research Foundation. Long range optical pointing for video screens. 4,591,841, Cl. 340-707.000.
Gundlach, Robert W.; and Bergen, Richard F., to Xerox Corporation. Efficient, self-limiting corona device for positive or negative charging. 4,591,713, Cl. 250-326.000.
Gutschmidt, Paul C., to Summers Mfg. Company, Inc. Hinge-wing drawbar mechanism. 4,591,181, Cl. 280-476.00R.
Guyer, James M.; Epstein, David I.; and Keating, David L., to Data General Corp. Data processing system with unique microcode control. 4,591,972, Cl. 364-200.000.
Haddadi, Ahmed: *See*—
Cousyn, Bernard; Haddadi, Ahmed; and Hennequin, Jean-Claude, 4,591,246, Cl. 351-204.000.
HaDiHo: *See*—
Rosenthal, Henry; and Kronhaus, Howard E., 4,590,737, Cl. 53-211.000.
Hafeman, Dean; Parce, John W.; and McConnell, Harden M., to Molecular Devices Corporation. Device having photoresponsive electrode for determining analytes including ligands and antibodies. 4,591,550, Cl. 435-4.000.
Hagiwara, Hirotoshi; Hiraoka, Hideo; and Ishii, Masaji, to Denki Kagaku Kogyo Kabushiki Kaisha. Electron gun for brightness. 4,591,754, Cl. 313-336.000.
Hagiwara, Yoshimune; Sugiyama, Shizuo; Maeda, Narimichi; Yumoto, Osamu; Akazawa, Takashi; Kobayashi, Masahito; Kita, Yasuhiro; and Kita, Yuzo, to Hitachi, Ltd.; and Hitachi Denshi Kabushiki Kaisha. Adder for floating point data suitable for digital signal processing. 4,592,006, Cl. 364-748.000.
Hagiwara, Yutaca; Kitamura, Terukiyo; and Murakami, Hideto, to Nissan Motor Co., Ltd. Disc brake having oppositely swingable cylinder and caliper. 4,591,028, Cl. 188-72.200.
Hain, Gottfried; and Krebs, Karl-Heinz, to Alpma Alpenland Maschinenbau & Co. KG. Automatic feed for food-slicing machine. 4,590,833, Cl. 83-367.000.
Hakamada, Kunio; Ishiguro, Satoshi; Wakabayashi, Hideo; and Ogawa, Kiyoshi, to Sony Corporation. Apparatus for controlling power supply to electronic circuitry. 4,591,914, Cl. 358-190.000.
Haken, Roger A., to Texas Instruments Incorporated. High voltage CMOS technology with N-channel source/drain extensions. 4,590,663, Cl. 29-571.000.
Hakkinen, Leo: *See*—
Paivalainen, Ossi; and Hakkinen, Leo, 4,591,005, Cl. 173-164.000.
Hakoyama, Akiyoshi: *See*—
Sasaki, Akira; Mashiko, Kazuyuki; Saitoh, Shouji; and Hakoyama, Akiyoshi, 4,591,878, Cl. 346-76.0PH.
Halfacre, Mark A.: *See*—
Owens, Alexander H.; Halfacre, Mark A.; Huie, Wing K.; and Pan, David S., 4,590,665, Cl. 29-571.000.
Hall, James E., to Firestone Tire & Rubber Company, The. Catalyst system and process for polymerizing conjugated dienes. 4,591,624, Cl. 526-177.000.
Hall, James F., Jr.: *See*—
Mayer, David; and Hall, James F., Jr., 4,590,852, Cl. 99-455.000.
Hall, Robert D.: *See*—
Major, Jeffrey T.; and Hall, Robert D., 4,591,750, Cl. 310-237.000.
Halliburton Company: *See*—
Evans, Robert T., 4,590,995, Cl. 166-127.000.
Hallman, Ellis A. Anchor device. 4,590,732, Cl. 52-704.000.
Halvorsen, Robert M.; and Hurst, Jeffrey B., to Ex-Cell-O Corporation. Fuel distribution valve flow trimming and locking means. 4,590,768, Cl. 60-741.000.
Hamada, Toru: *See*—
Takeuchi, Hiroshi; and Hamada, Toru, 4,591,348, Cl. 464-64.000.
Hamaguchi, Ichiro: *See*—
Sugiyama, Yasuo; So, Masaomi; Hamaguchi, Ichiro; and Maeda, Kenichi, 4,590,712, Cl. 51-161.000.
Hamanishi, Yoshinari, to Nippon Kogaku K. K. Rear focus conversion lens. 4,591,234, Cl. 350-422.000.
Hambric, James C., to Dresser Industries, Inc. Rotational power transmission apparatus. 4,590,820, Cl. 74-640.000.
Hamilton, James G.; Sullivan, Ann C.; Tobias, Lawrence D.; and Triscari, Joseph, to Hoffmann-La Roche Inc. Thromboxane synthase inhibitors as antiobesity agents. 4,591,594, Cl. 514-339.000.
Hamilton, Patrick D.: *See*—
Accetta, Joseph S.; Galan, Louis; Hamilton, Patrick D.; and Amick, James L., 4,592,063, Cl. 372-58.000.
Hamisch, Paul H., Jr., to Monarch Marking Systems, Inc. Hand-held electrically selectable labeler. 4,591,404, Cl. 156-384.000.
Hamm Chemie GmbH: *See*—
Gremm, Walter, 4,591,489, Cl. 423-100.000.
Hammarlund, Richard C., to Miner Enterprises, Inc. Railroad car draft gear assembly with friction bore wear liners. 4,591,059, Cl. 213-32.00R.
Hamon-Sobelco: *See*—
Peterson, Charles A., 4,591,462, Cl. 261-108.000.
Hanchett, Michael T.; Stone, Patrick B.; Bujack, Kurt W.; and Strand, Monte S., to Technical Designs Incorporated. Electronic inclination sensing device. 4,590,680, Cl. 33-366.000.

Hanna, John E., to Motorola, Inc. Comparator cell for analog-to-digital flash converter. 4,591,830, Cl. 340-347.0AD.

Hannig, Robert; and Rast, Jurgen. Chain coupling link. 4,590,758, Cl. 59-85.000.

Hansen, James E.: *See*—
Hutchison, Stanley O.; Oldershaw, Paul V.; and Hansen, James E., 4,591,006, Cl. 175-52.000.

Hara, Toyoyuki: *See*—
Hirota, Hisatoshi; Hara, Toyoyuki; and Kawahata, Masaichi, 4,591,677, Cl. 200-83.00J.

Harada, Hidekazu: *See*—
Miyafuji, Motohisa; Matsui, Takashi; and Harada, Hidekazu, 4,591,484, Cl. 420-481.000.

Harada, Minoru: *See*—
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Yanagida, Koji; Kitagawa, Kazuo; Ochiai, Atsuhiro; Harada, Minoru; and Matsumoto, Hiroshi, 4,591,454, Cl. 252-626.000.

Harada, Yoshio: *See*—
Yagi, Hiroshi; and Harada, Yoshio, 4,590,659, Cl. 29-564.600.

Harada, Yoshitsugu: *See*—
Kuboyama, Morio; Harada, Yoshitsugu; Kawashiri, Akio; and Takahashi, Eiji, 4,591,571. Cl. 436-533.000.

Harashima, Ikuro: *See*—
Hirasawa, Tadashi; and Harashima, Ikuro, 4,591,649, Cl. 549-232.000.

Hardage, Timothy W., to Food Machinery Sales, Inc. Tray loading method and apparatus. 4,590,743, Cl. 53-446.000.

Hargett, Hoke S.; Barton, Charles E.; and Boles, William D., to NL Industries, Inc. Annular electrical connectors for drill string. 4,591,226, Cl. 339-117.00R.

Harnish, James R.: *See*—
Shaffer, Jacob E.; Dellinger, Wayne D.; and Harnish, James R., 4,590,771, Cl. 62-156.000.

Harper, Frederick R. Shaving implement having adjustable annular blades. 4,590,674, Cl. 30-49.000.

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Prentice, John S.; and Uscategui, Gabriel J., 4,590,664, Cl. 29-571.000.
Seiler, Norman C., 4,591,826, Cl. 340-347.0DA.

Harris, Kenneth M.: *See*—
Lintott, Edward R.; and Harris, Kenneth M., 4,590,910, Cl. 123-458.000.

Harrison, Roy; and Turner, John D., to National Research Development Corporation. Machine for and method of packaging articles or goods. 4,590,748, Cl. 53-576.000.

Harrison, Stanley N.: *See*—
Wanasz, Michael J.; Harrison, Stanley N.; and McBride, Paul B., Jr., 4,591,763, Cl. 315-304.000.

Harrold, Ronald T., to Westinghouse Electric Corp. Acoustic waveguide monitoring. 4,590,803, Cl. 73-590.000.

Hart, Christopher G.: *See*—
Follows, Gordon W.; Hart, Christopher G.; and Massey, John, 4,591,468, Cl. 264-40.100.

Hartl, Franz. Sieving apparatus. 4,591,432, Cl. 209-247.000.

Hartman, John R., to Bio Image Corporation. Electrophoretogram analytical image processing system. 4,592,089, Cl. 382-6.000.

Hartmann, Manfred: *See*—
Reuter, Wolfgang; and Hartmann, Manfred, 4,590,983, Cl. 164-258.000.

Hartung, John: *See*—
Duttweiler, Donald L.; and Hartung, John, 4,591,669, Cl. 179-170.200.

Harwood, Jon W., to APX Group Inc. Method for fabricating an air gap pipe. 4,590,652, Cl. 29-157.00R.

Harwood, Ronald P. Lighting distribution system. 4,591,957, Cl. 362-148.000.

Hashimoto, Seiji, to Canon Kabushiki Kaisha. Color image pickup device. 4,591,899, Cl. 358-41.000.

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Broadhurst, Michael J.; Hassall, Cedric H.; and Thomas, Gareth J., 4,591,636, Cl. 536-6.400.

Hatebur Umformmaschinen AG: *See*—
Bachmann, Ernst, 4,590,780, Cl. 72-328.000.

Hattori, Toshihiro: *See*—
Asagi, Yasuyoshi; Ogawa, Noriaki; Kasai, Hitoshi; Hattori, Toshihiro; Ishihara, Masaki; and Uriuhara, Makoto, 4,591,038, Cl. 192-0.073.

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Havens, Richard C. Dielectric resonator stabilized oscillator and method for optimizing the operating characteristics thereof. 4,591,806, Cl. 331-96.000.

Havoic-Conroy, Stephanie M., to Westinghouse Electric Corp. Tool for removing split pin remnants from a nuclear reactor vessel. 4,590,671, Cl. 29-723.000.

Hawisher, Gary G.: *See*—
Stegens, Ronald E.; and Hawisher, Gary G., 4,591,812, Cl. 333-116.000.

Hayakawa, Toshiro; Miyauchi, Nobuyuki; and Yano, Seiki, to Sharp Kabushiki Kaisha. Semiconductor laser with active layer having reduced stress. 4,592,060, Cl. 372-44.000.

Hayashi, Hiroshi: *See*—
Yamamoto, Saburo; Hayashi, Hiroshi; and Yano, Seiki, 4,592,062, Cl. 372-48.000.

Hayashi, Isao: *See*—
Takahashi, Teruo; and Hayashi, Isao, 4,591,319, Cl. 417-360.000.

Hayashi, Yoshimasa, to Nissan Motor Co., Ltd. Valve supporting arrangement of an internal combustion engine. 4,590,900, Cl. 123-90.670.

Hays, George E.: *See*—
Yudovich, Amos; and Hays, George E., 4,591,362, Cl. 48-197.00R.

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Antonelli, Joseph A.; and Hazan, Isidor, 4,591,533, Cl. 428-520.000.

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Sohval, A. Robert; Cooperstein, Gerald; Goldstein, Shyke A.; and Hearn, David R., 4,592,079, Cl. 378-9.000.

Heatbath Corporation: *See*—
Jones, William C.; Britt, Kenneth R.; and Newell, Isaac L., 4,591,397, Cl. 148-15.500.

Hechler, Erwin, to Giulini Chemie GmbH. Means and method for neutral sizing. 4,591,412, Cl. 162-158.000.

Hecker, Joel; and Stern, Howard, to Robotic Vision Systems, Inc. Adaptive vision system. 4,591,253, Cl. 354-227.100.

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Steele, James H., Jr.; Heckler, Alan J.; Flowers, James W., Jr.; and Powley, George S., 4,591,395, Cl. 148-12.00D.

Heckmann, Klaus; and Spurny, Jiri, to Kernforschungszentrum Karlsruhe GmbH. Process for selective separation of plutonium from uranium and other metals. 4,591,488, Cl. 423-11.000.

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Hedenberg, Gunnar, 4,590,850, Cl. 99-348.000.

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Hedgley, Edward J., to Birkbeck College. Safety container for waste organic solvents. 4,591,061, Cl. 215-12.00R.

Heeb, Egon J.; Knop, Karl H.; and Morf, Rudolf H., to RCA Corporation. Encoding pattern for single chip CCD camera processing scheme. 4,591,900, Cl. 358-44.000.

Hegazi, Wafaa H. Modular construction system for the erection of buildings. 4,590,729, Cl. 52-437.000.

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Jeschke, Willi, 4,591,143, Cl. 271-227.000.

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Heilmeier & Weinlein Fabrik fur Oel-Hydraulik GmbH & Co. KG: *See*—
Brunner, Rudolf, 4,590,958, Cl. 137-115.000.

Heinrich, Theodore M.: *See*—
Mackenzie, Raymond W.; and Heinrich, Theodore M., 4,591,810, Cl. 332-9.00R.

Heintz, Richard P., to Deaccelerator Corporation. Vehicle speed control. 4,590,909, Cl. 123-360.000.

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Fuchs, Gerhard; Ehle, Joachim; and Heinzelmann, Hans-Peter, 4,592,067, Cl. 373-83.000.

Heishin Sobi Kabushiki Kaisha: *See*—
Ono, Tsuneo; and Nakamura, Yukinori, 4,591,322, Cl. 418-48.000.

Heit, Henry R.: *See*—
Reed, Charles J.; and Heit, Henry R., 4,590,791, Cl. 73-4.00R.

Helgstrand, Ake J. E.; Johansson, Karl N.; Misiorny, Alfons; Noren, Jan O.; and Stening, Goran B., to Astra Lakemedel Aktiebolag. Phosphonoformic acid esters and pharmaceutical compositions containing same. 4,591,583, Cl. 514-120.000.

Helinski, Richard R.: *See*—
Howard, Robert; Helinski, Richard R.; Larsen, John R.; and Menhennett, Herbert E., 4,591,281, Cl. 400-126.000.

Hellenbrand, Odon; and Spector, George. Hospital bed reading book support. 4,591,124, Cl. 248-447.200.

Heller, Lawrence G.: *See*—
Griffin, William R.; and Heller, Lawrence G., 4,591,993, Cl. 364-491.000.

Hellhake, Ferdinand: *See*—
Gallitzendoerfer, Joseph; Pfeiffer, Peter; Tomforde, Johann; and Hellhake, Ferdinand, 4,591,204, Cl. 296-202.000.

Hellige GmbH: *See*—
Orzikowski, Gunter; Niethammer, Rudolf; and Bahr, Jochen, 4,591,881, Cl. 346-117.00R.

Henderson, David: *See*—
Kerb, Ulrich; Sauer, Gerhard; Wiechert, Rudolf; Henderson, David; Nishino, Yukishige; and Beier, Sybille, 4,591,585, Cl. 514-177.000.

Henderson, Herman O., Jr.; and Coombs, Richard L., to Smith International, Inc. Temporary guide base retrieval method and apparatus. 4,591,296, Cl. 405-195.000.

Henke, Mitchell C., to Lincoln Manufacturing Company, Inc. Impingement oven with radiant panel. 4,591,333, Cl. 432-10.000.

Henkel Kommanditgesellschaft auf Aktien: *See*—
Christophliemk, Peter; and Wust, Willi, 4,591,491, Cl. 423-329.000.

Hennequin, Jean-Claude: *See*—
Cousyn, Bernard; Haddadi, Ahmed; and Hennequin, Jean-Claude, 4,591,246, Cl. 351-204.000.

Henning, Rainer: *See*—
Urbach, Hansjorg; Henning, Rainer; and Becker, Reinhard, 4,591,598, Cl. 514-412.000.

Henschke, Robert W.: *See*—
Mongeon, Robert J.; and Henschke, Robert W., 4,592,058, Cl. 372-32.000.

Hensel, John C.; and Penniman, Richard E., to Safeguard Business Systems, Inc. One-write pegboard keeper pin assembly. 4,591,188, Cl. 282-29.00B.
Hensler, Ewald: *See*—
Straub, Reinhold; and Eberhard, Eugen, 4,590,936, Cl. 128-305.000.
Hensley, Virgil. Torsional exercise device and method of use. 4,591,151, Cl. 272-140.000.
Herbage, Daniel: *See*—
Huc, Alain; Gimeno, Rene; and Herbage, Daniel, 4,591,456, Cl. 530-356.000.
Hercules Incorporated: *See*—
Berta, Dominic A., 4,591,617, Cl. 525-187.000.
Herczog, Andrew: *See*—
Bagley, Rodney D.; and Herczog, Andrew, 4,591,947, Cl. 361-310.000.
Herd, Karl J.; and Nickel, Horst, to Bayer Aktiengesellschaft. Trisazo/azoxy dyestuff mixtures. 4,591,634, Cl. 534-570.000.
Heredia, Jorge A. P.: *See*—
Figueroa, David S.; and Heredia, Jorge A. P., 4,590,966, Cl. 137-596.170.
Hertel, Hasso, to Hoechst Aktiengesellschaft. Process for preparing acid nitro dyestuffs for leather. 4,591,359, Cl. 8-436.000.
Hesener, Karl, to Paul Voss GmbH u. Co. Pivotal hinge for an arm of an awning. 4,590,642, Cl. 16-241.000.
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Bodor, Janos; Heslinga, Lammert; van Heteren, Jan; and de Vries, Bartholomeus, 4,591,507, Cl. 426-604.000.
Hewish, Nicholas A.: *See*—
Bricheno, Terry; Fielding, Alan; and Hewish, Nicholas A., 4,591,372, Cl. 65-4.200.
Hickin, Charles W. R.; and Austen, Michael D., to General Electric Company. Line smoothing for a raster display. 4,591,844, Cl. 340-728.000.
Hicks, Irwin A.; Jacobsen, Robert S.; Kee, David F.; and Schneider, George W., Jr., to American Meter Company. Method for determining the accuracy of a gas measurement instrument. 4,590,790, Cl. 73-3.000.
Hiereth, Hermann, to Daimler-Benz Aktiengesellschaft. Arrangement for influencing a cooling air flow. 4,590,889, Cl. 123-41.050.
Hiestand, Karl, to SMW Schneider & Weisshaupt GmbH. Power chuck. 4,591,172, Cl. 279-1.00J.
Higashimura, Toshinobu; and Masuda, Toshio, to Toray Industries, Incorporated. Membranes for liquid separations. 4,591,440, Cl. 210-640.000.
Highton, Frederick J., to General Electric Company. Adaptive bandwidth amplifier. 4,591,805, Cl. 330-294.000.
Hijikata, Kazuo: *See*—
Banno, Taiichi; Fujimori, Ryo; Takekawa, Hiroshi; and Hijikata, Kazuo, 4,591,568, Cl. 436-180.000.
Hill, William J. High yield gizzard harvesting apparatus. 4,590,643, Cl. 17-11.000.
Hiller, Thomas L.: *See*—
Beckner, Mark W.; Davis, James A.; Gausmann, Eric J.; Hiller, Thomas L.; Olson, Philip D.; and Van Dine, Gilbert A., 4,592,048, Cl. 370-60.000.
Hilpert, Fritz, to International Business Machines Corporation. Ribbon correction unit for printers. 4,591,283, Cl. 400-248.000.
Hilse, Gernot R. K., to Advanced Technology Laboratories, Inc. Close clearance seal for rotatable therapeutic catheters. 4,591,355, Cl. 604-159.000.
Hinger, Gary W.; and Crial, Richard S., to Boeing Company, The. Narrow gap welding torch. 4,591,685, Cl. 219-74.000.
Hino, Masanori; Kato, Toshiji; and Omori, Tatsuya, to Onkyo Kabushiki Kaisha. Dome speaker with cut-out portions in the voice coil bobbin. 4,591,667, Cl. 179-115.5ES.
Hirahata, Shigeru: *See*—
Komatsu, Shigeru; and Hirahata, Shigeru, 4,591,845, Cl. 340-745.000.
Hirano, Akira, to NEC Corporation. Method and apparatus for adaptive predictive encoding/decoding of multi-level picture signals. 4,591,908, Cl. 358-136.000.
Hirano, Yoshinori, to Nissan Motor Co., Ltd. Coolant level sensor arrangement for internal combustion engine. 4,590,893, Cl. 123-41.210.
Hirao, Yoshiaki; and Nagaoka, Yoshitomi, to Matsushita Electric Industrial Co., Ltd. Pulse signal amplitude storage-holding apparatus. 4,591,736, Cl. 307-267.000.
Hiraoka, Hideo: *See*—
Hagiwara, Hirotoshi; Hiraoka, Hideo; and Ishii, Masaji, 4,591,754, Cl. 313-336.000.
Hirasawa, Tadashi; and Harashima, Ikuro, to G-C Dental Industrial Corp. Compounds bondable to tooth substrates. 4,591,649, Cl. 549-232.000.
Hirate, Shintaro: *See*—
Yamada, Tetsusyo; and Hirate, Shintaro, 4,591,421, Cl. 204-406.000.
Hirota, Hisatoshi; Hara, Toyoyuki; and Kawahata, Masaichi, to TGK Company, Limited. Three-function pressure switch. 4,591,677, Cl. 200-83.00J.
Hirota, Kazuo: *See*—
Akahane, Shoji; Hirota, Kazuo; and Tomioka, Kentaro, 4,591,384, Cl. 106-35.000.
Akiba, Yutaka; and Hirota, Kazuo, 4,592,014, Cl. 365-1.000.
Akiba, Yutaka; and Hirota, Kazuo, 4,592,015, Cl. 365-2.000.
Hisano, Atushi, to Omron Tateisi Electronics Co. Image sensor system. 4,591,918, Cl. 358-225.000.
Hitachi Chemical Company, Ltd.: *See*—
Kawai, Hiromasa; Morinaga, Takashi; Miyajima, Hiromu; Akima, Toshio; Kato, Mitsuharu; and Hosoi, Yutaka, 4,591,626, Cl. 526-282.000.
Hitachi Denshi Kabushiki Kaisha: *See*—
Hagiwara, Yoshimune; Sugiyama, Shizuo; Maeda, Narimichi; Yumoto, Osamu; Akazawa, Takashi; Kobayashi, Masahito; Kita, Yasuhiro; and Kita, Yuzo, 4,592,006, Cl. 364-748.000.
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Akiba, Yutaka; and Hirota, Kazuo, 4,592,014, Cl. 365-1.000.
Akiba, Yutaka; and Hirota, Kazuo, 4,592,015, Cl. 365-2.000.
Atago, Takeshi, 4,590,912, Cl. 123-478.000.
Fuji, Masaaki; Izumi, Yuichi; and Kitaguchi, Hiroshi, 4,591,720, Cl. 250-362.000.
Hagiwara, Yoshimune; Sugiyama, Shizuo; Maeda, Narimichi; Yumoto, Osamu; Akazawa, Takashi; Kobayashi, Masahito; Kita, Yasuhiro; and Kita, Yuzo, 4,592,006, Cl. 364-748.000.
Kamiyama, Takaki, 4,591,746, Cl. 310-70.00A.
Kasubuchi, Fumiaki, 4,590,811, Cl. 74-7.00E.
Kikuchi, Seiki, 4,591,896, Cl. 357-79.000.
Kitaguchi, Hiroshi; and Fujii, Masaaki, 4,591,716, Cl. 250-336.100.
Komatsu, Shigeru; and Hirahata, Shigeru, 4,591,845, Cl. 340-745.000.
Miura, Kuniaki; Kobori, Yasunori; Fukushima, Isao; Shiomi, Makoto; and Kano, Kenji, 4,591,798, Cl. 329-102.000.
Miura, Kuniaki; Okada, Yoshinori; Fukushima, Isao; and Tamura, Teizo, 4,591,924, Cl. 358-330.000.
Nishita, Shigeo; Yamakido, Kazuo; and Ohwada, Kenichi, 4,591,827, Cl. 340-347.00C.
Ohnuki, Hideo, 4,592,037, Cl. 369-44.000.
Sakai, Kikuo; Onishi, Yoshiaki, deceased; and Onishi, Junko, administratrix, 4,592,024, Cl. 365-200.000.
Sakuma, Masashi; Nakagoshi, Kazuo; Shiraishi, Kazuhisa; and Ozaki, Shoji, 4,591,939, Cl. 360-46.000.
Sasaki, Akira; Mashiko, Kazuyuki; Saitoh, Shouji; and Hakoyama, Akiyoshi, 4,591,878, Cl. 346-76.0PH.
Sekiguchi, Yoshihiro; Yoshida, Kazutoshi; Chiba, Shinsaku; Sugie, Mamoru; and Aoki, Hirokazu, 4,592,016, Cl. 365-15.000.
Shimohigashi, Katsuhiro; Masuda, Hiroo; Ikuzaki, Kunihiko; and Kawamoto, Hiroshi, 4,592,022, Cl. 365-189.000.
Tanabe, Masatoshi; and Mikata, Kenzo, 4,591,438, Cl. 210-282.000.
Umeda, Takao; Ooishi, Kazuya; Igawa, Tatsuo; Hori, Yasuro; Nagae, Yoshiharu; and Isogai, Masato, 4,591,886, Cl. 346-160.000.
Yamada, Kazuji; Kobayashi, Ryoichi; Nagai, Yasuo; Shimizu, Isao; and Kawakami, Kanji, 4,591,780, Cl. 323-313.000.
Yamauchi, Teruo; and Oyama, Yoshishige, 4,590,915, Cl. 123-590.000.
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Nishita, Shigeo; Yamakido, Kazuo; and Ohwada, Kenichi, 4,591,827, Cl. 340-347.00C.
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Hjerten, Stellan. Method for cross-linking of agar products. 4,591,640, Cl. 536-114.000.
Ho, Teh C.; Young, Archie R., II; Chianelli, Russell R.; and Jacobson, Allan J., to Exxon Research and Engineering Co. Hydrotreating process employing catalysts comprising a supported mixture of a sulfide of a promoter metal, trivalent chromium and molybdenum or tungsten. 4,591,429, Cl. 208-254.00H.
Hodes, Erich; Lippok, Peter; and Miotk, Bernd, to Glyco Metall-Werke Daelen & Hofmann KG. Plain bearing and method of manufacture. 4,591,536, Cl. 428-643.000.
Hodge, Malcolm H., to TRW Inc. Optical fiber severing device and method. 4,591,082, Cl. 225-2.000.
Hodson, Baden L. Levelling device for ladders. 4,591,023, Cl. 182-200.000.
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Fischer, Edgar; and Voelskow, Hartmut, 4,591,639, Cl. 536-114.000.
Hertel, Hasso, 4,591,359, Cl. 8-436.000.
Urbach, Hansjorg; Henning, Rainer; and Becker, Reinhard, 4,591,598, Cl. 514-412.000.
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Davis, Larry; and Klein, Joseph T., 4,591,586, Cl. 514-211.000.
Hoehn, Gustave L., Jr., to Mobil Oil Corporation. Method for detecting soft spots in the hardness of steel casing. 4,591,785, Cl. 324-239.000.
Hoenig, Eckhardt, to Siemens Aktiengesellschaft. Multi-channel device with SQUIDS and superconducting gradiometers for the measurement of weak magnetic fields produced by various field sources. 4,591,787, Cl. 324-248.000.
Hofbauer, Peter: *See*—
Zimmermann, Klaus-Dieter; and Hofbauer, Peter, 4,590,902, Cl. 123-260.000.
Hofer, Gerald: *See*—
Faupel, Werner; and Hofer, Gerald, 4,590,913, Cl. 123-502.000.
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Broadhurst, Michael J.; Hassall, Cedric H.; and Thomas, Gareth J., 4,591,636, Cl. 536-6.400.
Hamilton, James G.; Sullivan, Ann C.; Tobias, Lawrence D.; and Triscari, Joseph, 4,591,594, Cl. 514-339.000.
Liu, Chao-Min; and Westley, John, 4,591,559, Cl. 435-76.000.
Hofmann, Eberhard; Pfeifle, Helmut; Schwartz, Reinhard; and Tschoeke, Helmut, to Robert Bosch GmbH. Fuel injection apparatus for

definite pilot injection and main injection in internal combustion engines. 4,590,903, Cl. 123-300.000.

Hofstede, Johannes M., to Cojafex B.V. Apparatus for separation of suspensions from a fluid under pressure. 4,591,436, Cl. 210-264.000.

Hogg, Tad H.: *See*—
Huberman, Bernardo A.; and Hogg, Tad H., 4,591,980, Cl. 364-200.000.

Holland, Varnum S., to Solid State Chargers Research & Development. Current pulse producing circuit. 4,591,778, Cl. 320-39.000.

Hollinden, David E.: *See*—
Belotserkovsky, Isaac M.; and Hollinden, David E., 4,591,912, Cl. 358-166.000.

Hollow, Richard H., to United States of America, National Aeronautics and Space Administration. Load positioning system with gravity compensation. 4,591,772, Cl. 318-632.000.

Holmen, Reynold E.; and Downing, Edward J., to Minnesota Mining and Manufacturing Company. Document having light-transmissive, electrically conductive authenticating interior layer. 4,591,189, Cl. 283-83.000.

Holopainen, Weikko R. Animal cradle. 4,590,887, Cl. 119-103.000.

Holzer, Helmut, to Carl Freudenberg, Firma. Sealing ring having torsion ribs. 4,591,168, Cl. 277-134.000.

Holzl, Robert A., to Air Products and Chemicals, Inc. Method for making self-protecting carbon bodies. 4,591,514, Cl. 427-249.000.

Honda, Akira; Yanagihashi, Yasuo; and Kumagai, Shinobu, to Nippon Kokan Kabushiki Kaisha. Apparatus for horizontally and intermittently withdrawing cast steel strand from horizontal mold of horizontal type continuous casting machine. 4,590,985, Cl. 164-440.000.

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Enjo, Sadamichi; Tsukiji, Yasuhiko; Wakatsuki, Goroei; and Noguchi, Toushi, 4,591,017, Cl. 180-205.000.
Matsuki, Ikuo; Kamiya, Naoyuki; Ikeda, Toshimitsu; Takagi, Yoshiari; Iizuka, Yoshio; Yamaguchi, Yoshinobu; Funai, Hiroshi; Terasawa, Mutsumi; and Tasaka, Susumu, 4,590,905, Cl. 123-321.000.
Nakajima, Tetsuo; and Aoi, Tomio, 4,591,986, Cl. 364-426.000.
Nakamura, Nagatoshi, 4,591,179, Cl. 280-291.000.

Honda, Takenobu, to Mitsubishi Denki Kabushiki Kaisha. Traction type elevator system. 4,591,025, Cl. 187-20.000.

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Bozarth, Theodore B., Jr.; Olsen, Arthur M.; and Rowlands, Ronald H., 4,592,002, Cl. 364-571.000.
Clarke, Charles J., Jr.; and Staggs, Kevin P., 4,591,842, Cl. 340-723.000.
Gregorich, David P.; and Mocker, Hans W., 4,591,761, Cl. 315-170.000.
Mott, Richard C., 4,590,970, Cl. 137-828.000.

Honeywell Information Systems Italia: *See*—
Mantellina, Calogero; Trivella, Roberto; and Quadraruopolo, Andrea, 4,592,011, Cl. 364-900.000.

Honzi, Youichi: *See*—
Hoshino, Akichika; and Honzi, Youichi, 4,590,773, Cl. 62-333.000.

Hopkins, Ronald J.: *See*—
Tolino, Ralph W.; Hopkins, Ronald J.; Congleton, Ray L.; and Popalis, Craig H., 4,591,068, Cl. 220-240.000.

Hopper, Bobby E. Tubing valve. 4,590,998, Cl. 166-331.000.

Hori, Saburo, to Kureha Kagaku Kogyo Kabushiki Kaisha. Process and an apparatus for producing a sinterable powdery material of minute composite ceramic particles having a dual structure. 4,591,471, Cl. 264-60.000.

Hori, Shozo: *See*—
Kitsunai, Tomoyuki; Saito, Kiyotaka; and Hori, Shozo, 4,591,619, Cl. 525-285.000.

Hori, Takako: *See*—
Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi; Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, 4,591,558, Cl. 435-68.000.

Hori, Yasuro: *See*—
Umeda, Takao; Ooishi, Kazuya; Igawa, Tatsuo; Hori, Yasuro; Nagae, Yoshiharu; and Isogai, Masato, 4,591,886, Cl. 346-160.000.

Horiguchi, Kiwami: *See*—
Kamiya, Minoru; Masuyama, Masayuki; Kitao, Ikuo; Wada, Shinji; and Horiguchi, Kiwami, 4,591,247, Cl. 351-211.000.
Takahashi, Susumu; and Horiguchi, Kiwami, 4,591,249, Cl. 354-62.000.

Horii, Takashi: *See*—
Takemae, Yoshihiro; Ogawa, Junji; Fujii, Yasuhiro; Nakano, Tomio; Tatematsu, Takeo; Horii, Takashi; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,592,025, Cl. 365-200.000.

Horikawa, Kazuo: *See*—
Goto, Chiaki; Horikawa, Kazuo; and Noguchi, Masaru, 4,591,714, Cl. 250-327.200.

Horimatsu, Kazuo, to Tekken Construction Co., Ltd. Method of building strengthened, embanked foundation. 4,591,297, Cl. 405-258.000.

Horlogerie Photographique Francaise: *See*—
Legros, Michel; and Montenot, Jean, 4,591,662, Cl. 179-2.0DP.

Horton, Robert L., to Phillips Petroleum Co. Removal of mercury from gases. 4,591,490, Cl. 423-210.000.

Horvat, George T. Traffic speed surveillance system. 4,591,823, Cl. 340-53.000.

Hosel, Peter; and Plaschke, Herbert, to Agfa-Gevaert AG. Apparatus for loading and unloading a film cassette, in particular an X-ray film cassette. 4,590,738, Cl. 53-266.00R.

Hoshi, Hideaki; Okumura, Jun; Naito, Takayuki; Abe, Yoshio; and Aburaki, Shimpei, to Bristol-Myers Company. Substituted vinyl cephalosporins. 4,591,641, Cl. 544-16.000.

Hoshino, Akichika; and Honzi, Youichi, to General Corporation, The. Heat exchanger for refrigerator. 4,590,773, Cl. 62-333.000.

Hoskin, Dennis H.; Rollmann, L. Deane; Shoemaker, Gerald L.; and Schmitt, Kirk D., to Mobil Oil Corporation. Use of polyalkoxy sulfonate surfactants for inhibition of scale formation. 4,590,996, Cl. 166-244.100.

Hosoi, Yutaka: *See*—
Kawai, Hiromasa; Morinaga, Takashi; Miyajima, Hiromu; Akima, Toshio; Kato, Mitsuharu; and Hosoi, Yutaka, 4,591,626, Cl. 526-282.000.

Hotchkiss-Brandt Sogeme H.B.S.: *See*—
Divoux, Michel; Constant, Bernard; and Ranchon, Marcel, 4,591,142, Cl. 271-196.000.

Hotta, Yoshio: *See*—
Masaki, Yuichi; and Hotta, Yoshio, 4,591,240, Cl. 350-339.00R.

Houghtalen, Steven R.: *See*—
Buonomo, Joseph P.; Houghtalen, Steven R.; Losinger, Raymond E.; and Valashinas, James W., 4,591,982, Cl. 364-200.000.

Houpt, Grover K., to American Manufacturing Company, Inc. Circuit board-terminal-housing assembly. 4,591,950, Cl. 361-399.000.

Howard, Norman A., to National Semiconductor Corporation. Cryogenic liquid heat exchanger. 4,590,770, Cl. 62-52.000.

Howard, Robert; Helinski, Richard R.; Larsen, John R.; and Menhennett, Herbert E., to Howtek, Inc. Sheet-feed mechanism for rotary print head. 4,591,281, Cl. 400-126.000.

Howtek, Inc.: *See*—
Howard, Robert; Helinski, Richard R.; Larsen, John R.; and Menhennett, Herbert E., 4,591,281, Cl. 400-126.000.

Hruby, John O., Jr. Loudspeaker enclosure with isolation of loudspeaker vibration. 4,591,020, Cl. 181-145.000.

Huang, Alan; and O'Neill, Jay H., to AT&T Bell Laboratories. Bus oriented LIFO/FIFO memory. 4,592,019, Cl. 365-78.000.

Huber, Wolfgang, to KUKA Wehrtechnik GmbH. Loading ramp for cartridges interstaged between a magazine and a gun. 4,590,843, Cl. 89-45.000.

Huberman, Bernardo A.; and Hogg, Tad H., to Xerox Corporation. Adaptive self-repairing processor array. 4,591,980, Cl. 364-200.000.

Huc, Alain; Gimeno, Rene; and Herbage, Daniel, to Bioetica, S.A. Process for obtaining homogeneous layers of native collagen, its application in covering or encapsulating various supports and the supports thus covered. 4,591,456, Cl. 530-356.000.

Hudson, Carl W., to Exxon Research and Engineering Co. Process for the denitrogenation of nitrogen-containing hydrocarbon compounds. 4,591,430, Cl. 208-254.00H.

Hughes Aircraft Company: *See*—
Komadina, Bruce M.; Lazarevich, Vladeta D.; and Beining, August H., 4,591,710, Cl. 250-221.000.
Lucas, Charles H.; and Lewyn, Lanny L., 4,591,808, Cl. 331-116.0FE.
Mulliner, Richard R.; and Ajioka, James S., 4,591,088, Cl. 228-121.000.
Reimann, William G., 4,591,411, Cl. 156-634.000.

Hughes, Anthony J.; Saunders, Frances C.; and Shanks, Ian A., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Liquid crystal displays. 4,591,849, Cl. 340-784.000.

Hughes, David W.: *See*—
Paulson, Wayne M.; and Hughes, David W., 4,591,821, Cl. 338-308.000.

Hughes, Gerry A., to Samsonite Corporation. Means for securing tubular members in fixed spaced relation. 4,591,287, Cl. 403-237.000.

Hugo, Peter; and Noack, Rainer, to Rhein-Chemie Rheinau GmbH. Process for the production of 2-(hydrocarbyldithio)-5-mercapto-1,3,4-thiadiazoles. 4,591,645, Cl. 548-142.000.

Huhle, Horst, to Linhof Prazisions-Kamera-Werke GmbH. Photographic ground-glass plate camera. 4,591,252, Cl. 354-191.000.

Huie, Wing K.: *See*—
Owens, Alexander H.; Halfacre, Mark A.; Huie, Wing K.; and Pan, David S., 4,590,665, Cl. 29-571.000.

Huignard, Jean-Pierre, to Thomson-CSF. Acousto-optical spectrum analyzer. 4,591,241, Cl. 350-358.000.

Huijser, Arie: *See*—
deBoer, Eeltje; and Huijser, Arie, 4,591,898, Cl. 358-36.000.

Hull, Francis R. Supply make-up air attachment for exhaust booths. 4,590,847, Cl. 98-115.300.

Humbert, Daniel: *See*—
Gasc, Jean-Claude; Humbert, Daniel; and Hunt, Peter F., 4,591,589, Cl. 514-248.000.

Humphrey, John R., to International Packaging Machines, Inc. Constant tension stretch wrapping machine. 4,590,746, Cl. 53-556.000.

Hundertmark, James M., to Brunswick Corp. Idle fuel residual storage system. 4,590,897, Cl. 123-73.00A.

Hunkin, Geoffrey G.; and Reed, Thomas A. Liquid sample collector and method for obtaining samples. 4,590,810, Cl. 73-864.630.

Hunt, Michael S.; Mundell, Peter J.; and Strover, Angus E., to South African Invention Development Corporation. Surgical implant. 4,590,928, Cl. 128-92.00D.

Hunt, Peter F.: *See*—
Gasc, Jean-Claude; Humbert, Daniel; and Hunt, Peter F., 4,591,589, Cl. 514-248.000.
Jouquey, Alain; and Hunt, Peter F., 4,591,461, Cl. 558-429.000.

Hunter, William A. Automatic core setting machine. 4,590,982, Cl. 164-253.000.

Hurst, George T.: *See—*
Andrews, John R.; Stewart, Philip S. B.; and Hurst, George T., 4,591,103, Cl. 241-4.000.
Hurst, Jeffrey B.: *See—*
Halvorsen, Robert M.; and Hurst, Jeffrey B., 4,590,768, Cl. 60-741.000.
Hutchison, Stanley O.; Oldershaw, Paul V.; and Hansen, James E., to Chevron Research Company. Well servicing rig. 4,591,006, Cl. 175-52.000.
Icaro Olivieri & C. S.p.A.: *See—*
Oliviero, Olivieri, 4,590,691, Cl. 36-119.000.
ICI Australia Limited: *See—*
Andrews, John R.; Stewart, Philip S. B.; and Hurst, George T., 4,591,103, Cl. 241-4.000.
Ide, Hideo: *See—*
Fukuoka, Hiromi; Asano, Keisuke; and Ide, Hideo, 4,590,988, Cl. 164-463.000.
Ide, Toshiaki: *See—*
Nishimatsu, Masaharu; Ide, Toshiaki; Kubota, Yuichi; Saito, Yoshiaki; and Arioka, Hiroyuki, 4,591,528, Cl. 428-212.000.
Igarashi, Katsutoshi: *See—*
Fuse, Yoshiro; Naganuma, Takao; Fujimori, Akiyoshi; Arai, Kozo; Igarashi, Katsutoshi; and Naito, Yuzi, 4,591,724, Cl. 250-492.100.
Igawa, Tatsuo: *See—*
Umeda, Takao; Ooishi, Kazuya; Igawa, Tatsuo; Hori, Yasuro; Nagae, Yoshiharu; and Isogai, Masato, 4,591,886, Cl. 346-160.000.
Iimura, Ikuro: *See—*
Matsubara, Toru; Iimura, Ikuro; Sakuma, Kuniharu; and Goto, Sumio, 4,590,879, Cl. 112-278.000.
Iizuka, Shigeo, to Yoshino Kogyosho Co., Ltd. Manual liquid dispenser. 4,591,076, Cl. 222-321.000.
Iizuka, Yoshio: *See—*
Matsuki, Ikuo; Kamiya, Naoyuki; Ikeda, Toshimitsu; Takagi, Yoshiari; Iizuka, Yoshio; Yamaguchi, Yoshinobu; Funai, Hiroshi; Terasawa, Mutsumi; and Tasaka, Susumu, 4,590,905, Cl. 123-321.000.
Ikeda, Masaki, to Tomy Kogyo Co., Inc. Self-righting vehicle with means for locking drive wheel. 4,591,346, Cl. 446-437.000.
Ikeda, Toshimitsu: *See—*
Matsuki, Ikuo; Kamiya, Naoyuki; Ikeda, Toshimitsu; Takagi, Yoshiari; Iizuka, Yoshio; Yamaguchi, Yoshinobu; Funai, Hiroshi; Terasawa, Mutsumi; and Tasaka, Susumu, 4,590,905, Cl. 123-321.000.
Ikeuchi, Jun-ichiro: *See—*
Senzaki, Shigeo; Ikeuchi, Jun-ichiro; Matsui, Toshikazu; and Sawazaki, Norikazu, 4,592,041, Cl. 369-126.000.
Ikuzaki, Kunihiko: *See—*
Shimohigashi, Katsuhiro; Masuda, Hiroo; Ikuzaki, Kunihiko; and Kawamoto, Hiroshi, 4,592,022, Cl. 365-189.000.
Illig, Egon; Gentischer, Josef; and Schmutz, Wolfgang, to Agfa-Gevaert Aktiengesellschaft. Arrangement for separating and transporting uppermost sheets of a stack of sheets or sheet-like objects. 4,591,140, Cl. 271-11.000.
Illinois Tool Works Inc.: *See—*
Nelson, John F., 4,591,285, Cl. 403-11.000.
Imai, Shigeo: *See—*
Suzuki, Migaku; Kobayashi, Toshio; Sasaki, Satoshi; and Imai, Shigeo, 4,591,513, Cl. 427-200.000.
Imai, Tetsuji, to Yoshida Kogyo K. K. Guide jig for lifting an outer wall member of a curtain wall. 4,591,308, Cl. 414-11.000.
Imamura, Iku, to Netsushin Co., Ltd. Method of preparing resistance thermometer. 4,590,669, Cl. 29-612.000.
IMI Marston Limited: *See—*
Brodie, George W., 4,591,520, Cl. 428-64.000.
Imperial Chemical Industries PLC: *See—*
Cass, Michael, 4,591,525, Cl. 428-195.000.
Follows, Gordon W.; Hart, Christopher G.; and Massey, John, 4,591,468, Cl. 264-40.100.
Impey, John, to Mettler, Rollin; Mettler, John; and Impey, John. Injection molded multi-layer circuit board and method of making same. 4,591,220, Cl. 339-17.00M.
Inazawa, Yoshizumi: *See—*
Furuya, Tsuneo; and Inazawa, Yoshizumi, 4,592,036, Cl. 369-32.000.
Incom, Inc.: *See—*
Jeskey, Richard V., 4,591,232, Cl. 350-96.270.
Industrial Research Products, Inc.: *See—*
Killion, Mead C., 4,592,087, Cl. 381-68.000.
Inkoma: *See—*
Obermeier, Manfred, 4,591,350, Cl. 464-138.000.
Inland Steel Company: *See—*
Fosnacht, Donald R.; and Tindyala, Masood A., 4,591,135, Cl. 266-275.000.
Inomata, Koichiro: *See—*
Kobayashi, Tadahiko; Sahashi, Masashi; Inomata, Koichiro; Domon, Tomokazu; and Fukuda, Hironori, 4,590,807, Cl. 73-862.360.
Inomata, Tetsuro: *See—*
Kawata, Yoshihiro; Sakata, Tsunetaka; Matsufuji, Teruo; Inomata, Tetsuro; and Miyashita, Hiroyuki, 4,592,046, Cl. 370-58.000.
Inoue, Taro. Rotatable barrel curling iron. 4,591,695, Cl. 219-225.000.
Inoue, Tohru: *See—*
Namekawa, Toshihiko; Kasahara, Masao; Tokiwa, Kinichiro; Inoue, Tohru; and Okamura, Shigeru, 4,592,054, Cl. 371-39.000.
Institut Francais du Petrole: *See—*
Levallois, Emile; Szabo, Rene; Clot, Jean; and Esteve, Daniel, 4,591,293, Cl. 405-170.000.
Institut fur Kerntechnik und Energiewandlung e.v.: *See—*
Koch, Dieter; and Noller, Friedemann, 4,591,688, Cl. 219-121.0EV.
Institutet for Optisk Forskning: *See—*
Ahlen, Hans O. S., 4,591,270, Cl. 356-333.000.
Instruments SA: *See—*
Laude, Jean-Pierre, 4,591,237, Cl. 350-96.150.
Intelligent Controls, Inc.: *See—*
D'Anci, Alexander, 4,591,831, Cl. 340-347.0SY.
Interferon Sciences, Inc.: *See—*
Keyes, Lynne D.; and Testa, Douglas, 4,591,557, Cl. 435-68.000.
Interlake, Inc.: *See—*
Garthus, Donald R., 4,591,275, Cl. 366-349.000.
Interletter AG: *See—*
Czichy, Eleonore, 4,591,527, Cl. 428-201.000.
International Business Machines Corporation: *See—*
Bensadon, Joseph M., 4,592,050, Cl. 370-103.000.
Beranger, Herve ; Brunin, Armand; and Rousseau, Jean-Paul, 4,592,023, Cl. 365-189.000.
Bialas, John S., Jr.; Daniels, Richard J.; and Mruk, William J., 4,591,738, Cl. 307-296.00R.
Bloom, Robert D.; Burke, Edward J.; and Kozol, Eugene T., 4,591,969, Cl. 364-183.000.
Bohlen, Harald; Bretscher, Erwin; Engelke, Helmut; Nehmiz, Peter; Vettiger, Peter; and Greschner, Johann, 4,591,540, Cl. 430-22.000.
Bradley, John P., 4,591,282, Cl. 400-144.200.
Bradshaw, Thomas H.; Golledge, Ian; and Pike, John V., 4,591,123, Cl. 248-349.000.
Broockman, Eric C.; and Fortenberry, Robert S., 4,591,236, Cl. 350-3.710.
Broockman, Eric C.; Cato, Robert T.; and Dickson, LeRoy D., 4,591,242, Cl. 350-3.710.
Bryant-Jeffries, Keith C.; Golledge, Ian; Pike, John V.; and Vaughan, Eric V., 4,591,120, Cl. 248-179.000.
Buonomo, Joseph P.; Houghtalen, Steven R.; Losinger, Raymond E.; and Valashinas, James W., 4,591,982, Cl. 364-200.000.
Comerford, Liam D., 4,592,057, Cl. 372-8.000.
Criscimagna, Tony N.; and Piston, Albert O., 4,591,847, Cl. 340-776.000.
Curtis, Donald E.; Vincent, James P.; and Weidmann, Mary E., 4,591,840, Cl. 340-706.000.
Gaebelein, Georg, deceased; Bhend, Richard B.; Keillor, Robert D.; Lovgren, Jeffrey L.; and Mercer, John R., 4,591,727, Cl. 250-578.000.
Griffin, William R.; and Heller, Lawrence G., 4,591,993, Cl. 364-491.000.
Hilpert, Fritz, 4,591,283, Cl. 400-248.000.
Prame, Eric S., 4,592,013, Cl. 364-900.000.
International Computers Limited: *See—*
Pratt, John M., 4,591,843, Cl. 340-728.000.
International Flavors & Fragrances, Inc.: *See—*
Mookherjee, Braja D.; Trenkle, Robert W.; Wolff, Robin K.; Boden, Richard M.; and Yoshida, Takao, 4,591,451, Cl. 252-522.00R.
International Packaging Machines, Inc.: *See—*
Humphrey, John R., 4,590,746, Cl. 53-556.000.
International Paper Company: *See—*
Olsen, William L.; Freeborn, John O.; Shaver, Linnea J.; and Kelemen, Janice J., 4,591,485, Cl. 422-20.000.
International Standard Electric Corporation: *See—*
De Brouckere, Lucien C.; Caers, Ludo M. J.; and Verbert, Karel H., 4,591,221, Cl. 339-19.000.
Jessop, Anthony; Catchpole, Richard J.; Dyke, Peter J.; and Farley, Brian S., 4,592,068, Cl. 375-3.000.
Kaiser, Manfred; and Stiepek, Wolfgang, 4,591,231, Cl. 350-96.180.
Kautz, Werner, 4,591,861, Cl. 343-404.000.
Mohr, Friedemann, 4,591,269, Cl. 356-350.000.
Rose, Jochen; and Zebisch, Manfred W., 4,591,674, Cl. 200-11.0DA.
International Telephone and Telegraph Corporation: *See—*
Schwarz, Albrecht; and Sosnowski, John D., 4,591,962, Cl. 363-15.000.
Internationale Octrooi Maatschappij "Octropa" B.V.: *See—*
Lok, Cornelis M.; and Ganguli, Keshab L., 4,591,579, Cl. 502-244.000.
Intevep, S.A.: *See—*
Krasuk, Julio H.; Silva, Fernando J.; Galiasso, Roberto E.; and Souto, Alfredo, 4,591,426, Cl. 208-96.000.
IPS Interproject Service AB: *See—*
Axelsson, Carl-Lennart; and Torssell, Krister, 4,591,381, Cl. 75-40.000.
Isayama, Takuro, to Ricoh Company, Ltd. Ink-jet printer head. 4,591,883, Cl. 346-140.00R.
Ishida, Yoshiyuki; and Taguchi, Yosio, to Nissan Motor Co., Ltd. Coolant passage system of internal combustion engine. 4,590,894, Cl. 123-41.740.
Ishiguro, Satoshi: *See—*
Hakamada, Kunio; Ishiguro, Satoshi; Wakabayashi, Hideo; and Ogawa, Kiyoshi, 4,591,914, Cl. 358-190.000.
Ishihara, Masaki: *See—*
Asagi, Yasuyoshi; Ogawa, Noriaki; Kasai, Hitoshi; Hattori, Toshihiro; Ishihara, Masaki; and Uriuhara, Makoto, 4,591,038, Cl. 192-0.073.

Ishihara, Takao, to Mitsubishi Jukogyo Kabushiki Kaisha. Coal-fired combined plant. 4,590,868, Cl. 110-347.000.

Ishii, Masaji: *See*—
Hagiwara, Hirotoshi; Hiraoka, Hideo; and Ishii, Masaji, 4,591,754, Cl. 313-336.000.

Ishii, Susumu: *See*—
Yoshida, Hiroshi; and Ishii, Susumu, 4,590,648, Cl. 24-415.000.

Ishii, Takatoshi; and Touyama, Osamu, to Tokyo Shibaura Denki Kabushiki Kaisha. Keyboard unit control system using block scanning techniques. 4,591,833, Cl. 340-365.00S.

Ishikawa, Hikaru: *See*—
Naito, Kazuo; Fuse, Tadashi; Tanuma, Itsuo; Fukuura, Yukio; and Ishikawa, Hikaru, 4,591,618, Cl. 525-279.000.

Ishitsuka, Shinichiro: *See*—
Iwamoto, Shigeyoshi; Saeki, Yoshifumi; Kuribayashi, Takashi; Ishitsuka, Shinichiro; and Ogino, Nobukuni, 4,591,951, Cl. 361-417.000.

Ishizaka, Hideo; and Fujii, Tadashi, to Terumo Corporation. Electronic clinical thermometer, and method of measuring body temperature. 4,592,000, Cl. 364-557.000.

Isobe, Mitsuo: *See*—
Matsukawa, Naohiro; Isobe, Mitsuo; and Sakurai, Takayasu, 4,592,026, Cl. 365-203.000.

Isobe, Shinichi; and Sawada, Kazuo, to Fanuc Ltd. Numerical controller. 4,591,770, Cl. 318-565.000.

Isogai, Masato: *See*—
Umeda, Takao; Ooishi, Kazuya; Igawa, Tatsuo; Hori, Yasuro; Nagae, Yoshiharu; and Isogai, Masato, 4,591,886, Cl. 346-160.000.

Israel Aircraft Industries, Ltd.: *See*—
Bar-Nefy, Simcha; and Tiomkin, Michael, 4,590,844, Cl. 89-1.130.

Isuda, Yoshio: *See*—
Yokoyama, Kazumasa; Fukaya, Chikara; Isuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,591,593, Cl. 514-307.000.

Isuzu Motors, Ltd.: *See*—
Uriuhara, Makoto; and Kuroyanagi, Junzo, 4,590,906, Cl. 123-339.000.

Italici, Rino, to Lucas International s.r.l. Composite handle for portable containers. 4,592,091, Cl. 383-15.000.

Italimpianti-Societa Italiana Impianti P.A.: *See*—
Repetto, Eugenio; Marafini, Fabrizio; and Tesini, Francesco, 4,592,066, Cl. 373-72.000.

Itazu, Fumio. Pressure regulator mechanism for hydraulic devices. 4,591,032, Cl. 188-313.000.

Ito, Akihiko; and Saito, Tadahiro, to Fujitsu Limited. CMOS circuit with separate power lines to suppress latchup. 4,591,895, Cl. 357-42.000.

Ito, Katsumi: *See*—
Sugihara, Hirosada; Nishikawa, Kohei; and Ito, Katsumi, 4,591,458, Cl. 260-239.30B.

Ito, Katsuo; Senga, Yasushi; and Murata, Yoshio, to Murata Manufacturing Co., Ltd. Electronic component comprising printed circuit elements disposed on a folded tape and method of making such component. 4,591,814, Cl. 333-177.000.

Ito, Masaaki: *See*—
Ando, Minato; Ito, Masaaki; and Mizuno, Fumio, 4,591,574, Cl. 501-136.000.

Itoh, Kazu, to Itoh Seiki Kabushiki Kaisha. Static pressure automatic control device for closed circuit respirator. 4,590,933, Cl. 128-205.240.

Itoh Seiki Kabushiki Kaisha: *See*—
Itoh, Kazu, 4,590,933, Cl. 128-205.240.

Itoh, Yasuo, to NEC Corporation. Echo canceller and echo suppressor for frequency divisional attenuation of acoustic echoes. 4,591,670, Cl. 179-170.200.

ITT Corporation: *See*—
Shen, Shannon N., 4,591,745, Cl. 307-592.000.

ITT Industries, Inc.: *See*—
Jaeger, Gerard, 4,591,052, Cl. 206-328.000.
Kornaker, Walter, 4,591,755, Cl. 313-412.000.
Nopper, Guido H., 4,592,008, Cl. 364-784.000.

Itzin, Michael: *See*—
Snyder, Irving F.; Vork, William D.; and Itzin, Michael, 4,591,096, Cl. 239-216.000.

Iwaki, Yoshiyuki, to Mitsubishi Denki Kabushiki Kaisha. Waterproof ball bearing device. 4,591,278, Cl. 384-480.000.

Iwamoto, Shigeyoshi; Saeki, Yoshifumi; Kuribayashi, Takashi; Ishitsuka, Shinichiro; and Ogino, Nobukuni, to Matsushita Electric Industrial Co., Ltd. Mounting arrangement for electronic components. 4,591,951, Cl. 361-417.000.

Iwasa, Seiichi, to Fujitsu Limited. Method of testing bubble memory devices. 4,592,052, Cl. 371-21.000.

Iwasaki Tsushinki Kabushiki Kaisha: *See*—
Kawata, Yoshihiro; Sakata, Tsunetaka; Matsufuji, Teruo; Inomata, Tetsuro; and Miyashita, Hiroyuki, 4,592,046, Cl. 370-58.000.

Iwashita, Masao, to NEC Corporation. Data-flow-type digital processing apparatus. 4,591,979, Cl. 364-200.000.

Iwaszkiewicz, Jerzy G.; and Kuxma, Janusz, to Telectronics Pty, Limited. Electrical connection. 4,590,950, Cl. 128-786.000.

Iwata Electric Co., Ltd.: *See*—
Iwata, Keisuke, 4,591,668, Cl. 179-121.00C.

Iwata, Keisuke, to Iwata Electric Co., Ltd. Vibration-detecting type microphone. 4,591,668, Cl. 179-121.00C.

Izumi, Masakazu: *See*—
Kurauchi, Makoto; Kobayashi, Takeshi; Izumi, Masakazu; and Aota, Jiro, 4,590,724, Cl. 52-223.00L.

Izumi, Yuichi: *See*—
Fuji, Masaaki; Izumi, Yuichi; and Kitaguchi, Hiroshi, 4,591,720, Cl. 250-362.000.

J. B. Lima, Inc.: *See*—
Linn, Leighton L.; and Mathiesen, Robert J., 4,591,499, Cl. 424-93.000.

J. B. N. Morris: *See*—
Chelette, K. Darrel; and Evans, Merle E., 4,591,195, Cl. 285-332.300.

Jackman, Peter R.; and Stratton, Paul P., to First Inertia Switch Limited. Inertia switch impact sensor. 4,591,676, Cl. 200-61.45M.

Jacobs, Dawn F.: *See*—
Kane, Russell D.; Greer, James B.; Jacobs, Dawn F.; and Berkowitz, Barry J., 4,591,393, Cl. 148-11.50N.

Jacobs, John H., to Bell & Howell Company. Method and apparatus for removal of dust from an information carrier during recording and playback. 4,591,938, Cl. 360-137.000.

Jacobsen, Robert S.: *See*—
Hicks, Irwin A.; Jacobsen, Robert S.; Kee, David F.; and Schneider, George W., Jr., 4,590,790, Cl. 73-3.000.

Jacobson, Allan J.: *See*—
Ho, Teh C.; Young, Archie R., II; Chianelli, Russell R.; and Jacobson, Allan J., 4,591,429, Cl. 208-254.00H.

Jacobson, Stephen R., to Mitre Corporation, The. Beacon/radar video generator system for air traffic simulation. 4,591,858, Cl. 343-17.700.

Jaeger, Gerard, to ITT Industries, Inc. Small component storage apparatus. 4,591,052, Cl. 206-328.000.

Jager, Horst, to Bayer Aktiengesellschaft. Triphendioxazine reactive dyestuffs. 4,591,643, Cl. 544-76.000.

James, Ronald O., to Leggett & Platt, Incorporated. Glider recliner. 4,591,205, Cl. 297-85.000.

Janome Sewing Machine Co., Ltd.: *See*—
Makabe, Hachiro; Tanaka, Haruhiko; and Kongoh, Takashi, 4,590,880, Cl. 112-445.000.

Jansen, Hansjurgen; and Gelsen, Karl-Heinz, to Sita Bauelemente GmbH. Control unit for switching on a teaching device. 4,591,729, Cl. 307-116.000.

Japan Analyst Corporation: *See*—
Ohtsubo, Takashi; Kawase, Hirahisa; and Goto, Syunsuke, 4,590,809, Cl. 73-863.530.

Japan Speed Shore Co., Ltd.: *See*—
Fukumori, Kenichi; and Kamimura, Katsumi, 4,591,298, Cl. 405-282.000.

Japan Synthetic Rubber Co., Ltd.: *See*—
Fuse, Yoshiro; Naganuma, Takao; Fujimori, Akiyoshi; Arai, Kozo; Igarashi, Katsutoshi; and Naito, Yuzi, 4,591,724, Cl. 250-492.100.
Kato, Hiroshi; Nakada, Hitoshi; Nishiwaki, Isao; Teramoto, Toshio; Yagii, Keikichi; and Niinomi, Masahiro, 4,591,672, Cl. 179-115.5VC.

Jarvis, Michael R.; and Fulton, Donald S., to United States of America, National Aeronautics and Space Administration. Spillage detector for liquid chromatography systems. 4,591,838, Cl. 340-605.000.

Javorik, Laszlo, to Grotnes Metalforming Systems, Inc. Method for expanding a tubular member. 4,590,655, Cl. 29-421.00R.

Jeanson, Richard L.; and Olson, John B., to Fortec, Inc. Book retaining device and method of using same. 4,591,187, Cl. 281-45.000.

Jekat, Herbert: *See*—
Klima, Hubertus; and Jekat, Herbert, 4,591,493, Cl. 423-383.000.

Jenkins, Leonard A.; and Turner, Terence A., to Metal Box plc. Decorating metal can containers from flexible transfer paper carrier which is heated to shrink onto can. 4,591,360, Cl. 8-471.000.

Jenkins, Robert F.; and Siadat, Bahram, to W. R. Grace & Co. Ionomeric polymer compositions. 4,591,611, Cl. 524-64.000.

Jenny, Werner: *See*—
Weiblen, Richard; and Jenny, Werner, 4,591,300, Cl. 408-59.000.

Jeroszko, Ronald A.: *See*—
Lohmann, Robert P.; and Jeroszko, Ronald A., 4,590,769, Cl. 60-752.000.

Jeschke, Willi, to Heidelberger Druckmaschinen AG. Apparatus and method for in-register feeding of sheets. 4,591,143, Cl. 271-227.000.

Jeskey, Richard V., to Incom, Inc. Optical display screen utilizing light-absorbing fibers. 4,591,232, Cl. 350-96.270.

Jessop, Anthony; Catchpole, Richard J.; Dyke, Peter J.; and Farley, Brian S., to International Standard Electric Corporation. Repeater for a digital transmission system. 4,592,068, Cl. 375-3.000.

Jidai, Eiki: *See*—
Nakajima, Hiroyuki; Miyamoto, Fumiyuki; Murayama, Masakazu; Oka, Seiji; and Jidai, Eiki, 4,591,623, Cl. 525-524.000.

Johansson, Karl N.: *See*—
Helgstrand, Ake J. E.; Johansson, Karl N.; Misiorny, Alfons; Noren, Jan O.; and Stening, Goran B., 4,591,583, Cl. 514-120.000.

Johns Hopkins University, The: *See*—
Miller, Paul S.; and T'so. Paul O. P., 4,591,614, Cl. 525-54.110.

Johnson, Lonnie G. Squirt gun. 4,591,071, Cl. 222-39.000.

Johnson Matthey Public Limited Company: *See*—
McFarlane, Glenton P., 4,590,957, Cl. 137-68.100.

Johnson, Peter D.: *See*—
Chalek, Carl L.; and Johnson, Peter D., 4,591,759, Cl. 313-638.000.

Jones, Bill F., to MWC Lighting. Lighting optical system. 4,591,960, Cl. 362-298.000.

Jones, Courtney J.: *See*—
Emory, Lyle J.; and Jones, Courtney J., 4,591,099, Cl. 239-419.000.

Jones, John H.; and Brown, Tom, to National Research Development Corp. Histidine protection. 4,591,648, Cl. 548-344.000.

Jones, Nigel J.: *See—*
Temple, Stephen; Jones, Nigel J.; and Syrop, Alan N., 4,590,749, Cl. 53-576.000.

Jones, William C.; Britt, Kenneth R.; and Newell, Isaac L., to Heatbath Corporation. Non-cyanide salt bath and process for carburization of ferrous metals and alloys. 4,591,397, Cl. 148-15.500.

Jouquey, Alain; and Hunt, Peter F., to Roussel Uclaf. Preparation of tri-cyclo nitriles. 4,591,461, Cl. 558-429.000.

Jouve, Hubert: *See—*
Fedeli, Jean M.; Jouve, Hubert; Magnin, Joel; and Pisella, Christian, 4,592,017, Cl. 365-19.000.

Jujo Paper Co., Ltd.: *See—*
Satake, Toshimi; Minami, Toshiaki; and Fujimura, Fumio, 4,591,888, Cl. 346-209.000.

Jurny, Josef: *See—*
Sedlak, Vaclav; Jurny, Josef; and Luner, Vaclav, 4,590,858, Cl. 101-352.000.

Kabel- und Metallwerke G. AG: *See—*
Leykamm, Herbert; and Knabel, Siegfried, 4,590,782, Cl. 72-354.000.

Kabushiki Kaisha Daikin Seisakusho: *See—*
Takeuchi, Hiroshi; and Hamada, Toru, 4,591,348, Cl. 464-64.000.

Kabushiki Kaisha Kobe Seiko Sho: *See—*
Miyafuji, Motohisa; Matsui, Takashi; and Harada, Hidekazu, 4,591,484, Cl. 420-481.000.

Kabushiki Kaisha Ohara Kogaku Garasu Seizosho: *See—*
Sato, Bunryo, 4,591,373, Cl. 65-29.000.

Kabushiki Kaisha Sato: *See—*
Yokota, Yuuji; Kajiya, Hiroshi; and Karuishi, Kazuhiro, 4,591,879, Cl. 346-76.0PH.

Kabushiki Kaisha Toshiba: *See—*
Kobayashi, Tadahiko; Sahashi, Masashi; Inomata, Koichiro; Domon, Tomokazu; and Fukuda, Hironori, 4,590,807, Cl. 73-862.360.
Saruwatari, Ryoji; and Taniyama, Yoshiharu, 4,591,261, Cl. 355-4.000.
Takahashi, Ryouichi, 4,591,790, Cl. 324-318.000.
Tanaka, Kazuyuki; and Nishigaki, Noriaki, 4,590,976, Cl. 141-66.000.

Kafri, Oded; Livnat, Aminadav; and Keren, Eliezer, to State of Israel, Atomic Energy Commission, Nuclear Research Center Negev, The. Level based on moire effect with ambient light. 4,590,681, Cl. 33-378.000.

Kageyama, Toshinobu: *See—*
Mohri, Kaneo; and Kageyama, Toshinobu, 4,591,788, Cl. 324-260.000.

Kainuma, Keiji; and Kobayashi, Shoichi, to Director of National Food Research Institute Ministry of Agriculture, Forstry and Fisheries. Process for saccharification of starch using enzyme produced by fungus belonging to genus Chalara. 4,591,560, Cl. 435-96.000.

Kaiser, Manfred; and Stiepek, Wolfgang, to International Standard Electric Corporation. Variable optical attenuator. 4,591,231, Cl. 350-96.180.

Kaiser, William J.; and Logothetis, Eleftherios M., to Ford Motor Company. Tandem deposition of cermets. 4,591,417, Cl. 204-192.00R.

Kajati, Istvan: *See—*
Kovacs, Antal; Erdei, Janos; Kovats, Karoly; Polya, Laszlo ; Pasztor, Karoly; Nagy, Janos; Pepo , Pal; Pepo , Peter; Kiss, Gyorgy; and Kajati, Istvan, 4,591,379, Cl. 71-94.000.

Kajiura, Takatsugu, to Nissan Motor Company, Limited. Method for controlling automotive vehicle assembly and a system performing the method. 4,590,654, Cl. 29-407.000.

Kajiwara, Makoto: *See—*
Matsuzaka, Syoji; Kajiwara, Makoto; Miyoshi, Masanobu; and Yamashita, Kiyoshi, 4,591,549, Cl. 430-569.000.

Kajiwara, Tadashi: *See—*
Ouchi, Koji; Tsurumaru, Shinobu; Kajiwara, Tadashi; and Kumamoto, Kenichiro, 4,592,093, Cl. 455-4.000.

Kajiya, Hiroshi: *See—*
Yokota, Yuuji; Kajiya, Hiroshi; and Karuishi, Kazuhiro, 4,591,879, Cl. 346-76.0PH.

Kalasz, Huba: *See—*
Tyihak, Erno; Mincsovics, Emil; Knoll, Jozsef; Zoltan, Sandor; Lak, Istvan; Tetenyi, Peter; Kalasz, Huba; and Nagy, Janos, 4,591,524, Cl. 428-167.000.

Kallay, Adam G. Illuminating device producing a ripple effect. 4,591,955, Cl. 362-101.000.

Kamimura, Katsumi: *See—*
Fukumori, Kenichi; and Kamimura, Katsumi, 4,591,298, Cl. 405-282.000.

Kaminaga, Hiromitsu, to Yoshida Kogyo K. K. System for sealing cross joint of four adjacent curtain wall units. 4,590,725, Cl. 52-235.000.

Kamitani, Masaaki; and Tsuji, Hidenori, to Ebara-Udylite Co., Ltd. Chromate composition and process for treating zinc-nickel alloys. 4,591,416, Cl. 204-35.100.

Kamiya, Hitoshi: *See—*
Nakarai, Masazumi; and Kamiya, Hitoshi, 4,591,937, Cl. 360-101.000.

Kamiya, Minoru; Masuyama, Masayuki; Kitao, Ikuo; Wada, Shinji; and Horiguchi, Kiwami, to Tokyo Kogaku Kikai Kabushiki Kaisha. Eye refractometer. 4,591,247, Cl. 351-211.000.

Kamiya, Naoyuki: *See—*
Matsuki, Ikuo; Kamiya, Naoyuki; Ikeda, Toshimitsu; Takagi, Yoshiari; Iizuka, Yoshio; Yamaguchi, Yoshinobu; Funai, Hiroshi; Terasawa, Mutsumi; and Tasaka, Susumu, 4,590,905, Cl. 123-321.000.

Kamiyama, Takaki, to Hitachi, Ltd. Ignition signal generator for internal combustion engines. 4,591,746, Cl. 310-70.00A.

Kanazawa, Yuki: *See—*
Shimizu, Shokichi; Aoki, Hideji; Kida, Susumu; and Kanazawa, Yuki, 4,590,672, Cl. 29-827.000.

Kane, Russell D.; Greer, James B.; Jacobs, Dawn F.; and Berkowitz, Barry J., to Exxon Production Research Co.; and Exxon Research & Engineering Co. Alloys having improved resistance to hydrogen embrittlement. 4,591,393, Cl. 148-11.50N.

Kaneda, Naoya; Toyama, Masamichi; Kozuki, Susumu; Kohtani, Yutaka; and Fujiwara, Akihiro, to Canon Kabushiki Kaisha. Automatic focus control system and camera using same. 4,591,919, Cl. 358-227.000.

Kaneko, Ichiro: *See—*
Shimizu, Toshihide; Kaneko, Ichiro; and Shimakura, Yoshiteru, 4,591,391, Cl. 134-22.170.

Kanemitsu, Shinji: *See—*
Nishino, Fumio; Onoda, Shigeyoshi; Nomura, Akihiro; Mizutani, Morikazu; Kanemitsu, Shinji; and Toriumi, Mototada, 4,591,258, Cl. 355-3.00R.

Kaneno, Nobuaki; and Takahashi, Kazuhisa, to Mitsubishi Denki Kabushiki Kaisha. Method and apparatus for evaporating a liquid organic metal. 4,591,464, Cl. 261-153.000.

Kang, Uan G.; Bush, Richard W.; Ketley, Arthur D.; and Ferrin, Clifford A., Jr., to W. R. Grace & Co. Liquid photopolymers curable to fire-retardant, hydrolysis resistant compositions. 4,591,522, Cl. 428-419.000.

Kanno, Masahide: *See—*
Tanikawa, Kouji; Matsui, Koichi; Taniguchi, Akira; Amano, Atsushi; Kanno, Masahide; and Takahashi, Yutaka, 4,590,924, Cl. 128-6.000.

Kano, Kenji: *See—*
Miura, Kuniaki; Kobori, Yasunori; Fukushima, Isao; Shiomi, Makoto; and Kano, Kenji, 4,591,798, Cl. 329-102.000.

Kanou, Hideo: *See—*
Koumura, Ichiro; Kanou, Hideo; Okunishi, Masahiko; and Yamada, Kazuhiko, 4,591,554, Cl. 435-18.000.

KAO Corporation: *See—*
Kawase, Jiro; and Tokano, Takao, 4,591,498, Cl. 424-70.000.
Naito, Sachio; and Nemoto, Toshiyuki, 4,591,497, Cl. 424-43.000.

Karakal Corp. of the Americas: *See—*
Sines, Randy D.; and Farber, Bruce W., 4,591,165, Cl. 273-73.00D.

Karam, Fouad T.; and Sibalis, Jack I., to American Cyanamid Company. Hydroxyalkyl melamine containing resins and their use in heat and pressure consolidated laminates. 4,591,613, Cl. 524-597.000.

Karlichek, Gregory J.; and Secord, Ronald J. Tool reaction balancing mechanism. 4,591,128, Cl. 248-652.000.

Karlock, James A. Video detail enhancing circuit. 4,591,735, Cl. 307-260.000.

Karolyi, Stephen: *See—*
Poran, Michael; Langner, Carl; and Karolyi, Stephen, 4,590,984, Cl. 164-426.000.

Kart Guard Internationale, Inc.: *See—*
Upton, Gene; and Brown, Dennis, 4,591,175, Cl. 280-33.99C.

Karuishi, Kazuhiro: *See—*
Yokota, Yuuji; Kajiya, Hiroshi; and Karuishi, Kazuhiro, 4,591,879, Cl. 346-76.0PH.

Kasahara, Masao: *See—*
Namekawa, Toshihiko; Kasahara, Masao; Tokiwa, Kinichiro; Inoue, Tohru; and Okamura, Shigeru, 4,592,054, Cl. 371-39.000.

Kasai, Hitoshi: *See—*
Asagi, Yasuyoshi; Ogawa, Noriaki; Kasai, Hitoshi; Hattori, Toshihiro; Ishihara, Masaki; and Uriuhara, Makoto, 4,591,038, Cl. 192-0.073.

Kashio, Toshio, to Casio Computer Co., Ltd. Electronic musical instrument. 4,590,838, Cl. 84-1.010.

Kashiwabara, Hoichiro: *See—*
Kawamura, Toshihide; Kashiwabara, Hoichiro; Waki, Osamu; and Sakai, Hiro, 4,591,954, Cl. 362-61.000.

Kassabov, Nikola K., to V M E I "Lenin" Quartal Darvenitza. Multimicroprocessor system. 4,591,981, Cl. 364-200.000.

Kassai, Kenzou, to Aprica Kassai Kabushikikaisha. Locking mechanism for push-rod of baby carriage. 4,591,176, Cl. 280-47.360.

Kasubuchi, Fumiaki, to Hitachi, Ltd. Reduction starter. 4,590,811, Cl. 74-7.00E.

Katerberg, James A.; Kopp, Gregory M.; and Piatt, Michael J., to Eastman Kodak Company. Ink jet printing apparatus and method providing an induced, clean-air region. 4,591,869, Cl. 346-1.100.

Kato, Hiroshi; Nakada, Hitoshi; Nishiwaki, Isao; Teramoto, Toshio; Yagii, Keikichi; and Niinomi, Masahiro, to Pioneer Electronic Corporation; and Japan Synthetic Rubber Co., Ltd. Loud speaker assembly. 4,591,672, Cl. 179-115.5VC.

Kato, Mitsuharu: *See—*
Kawai, Hiromasa; Morinaga, Takashi; Miyajima, Hiromu; Akima, Toshio; Kato, Mitsuharu; and Hosoi, Yutaka, 4,591,626, Cl. 526-282.000.

Kato, Nobuhide; and Murase, Takao, to NGK Insulators, Ltd. Electrochemical oxygen sensor. 4,591,422, Cl. 204-426.000.

Kato, Nobuhide; and Murase, Takao, to NGK Insulators, Ltd. Oxygen sensor. 4,591,423, Cl. 204-428.000.

Kato, Toshiji: *See—*
Hino, Masanori; Kato, Toshiji; and Omori, Tatsuya, 4,591,667, Cl. 179-115.5ES.

Katsman, Ilya; Ritchie, John A.; Burmenko, Mark; and Zaltsman, Vladimir, to Cooper Industries, Inc. Door support for a battery storage cabinet or the like. 4,590,709, Cl. 49-396.000.

Katz, Paul C.: *See*—
Myles, Sam A.; and Katz, Paul C., 4,591,961, Cl. 362-390.000.

Katz, Philip: *See*—
Brenman, Henry S.; Schwartz, Harold L.; and Katz, Philip, 4,590,942, Cl. 128-419.00R.

Katzfey, Lance: *See*—
Davidov, Mircho A.; and Katzfey, Lance, 4,591,915, Cl. 358-194.100.

Kauer, Erhard: *See*—
Lenhard-Backhaus, Hugo; and Kauer, Erhard, 4,591,349, Cl. 464-136.000.

Kaufman, Rudolph: *See*—
Thouret, Wolfgang E.; Kaufman, Rudolph; and Kee, Harry, 4,591,752, Cl. 313-25.000.

Kaule, Wittich: *See*—
Stenzel, Gerhard; and Kaule, Wittich, 4,591,707, Cl. 235-493.000.

Kaupinis, William M.: *See*—
Nissen, Stanley M.; Grobicki, Chris J.; and Kaupinis, William M., 4,591,977, Cl. 364-200.000.

Kautz, Jon F.: *See*—
Dornes, Bryan J.; Kautz, Jon F.; Paukovits, Edward J., Jr.; Spong, Richard V.; Talarico, Robert J.; and Prescott, Harry G., 4,590,673, Cl. 29-845.000.

Kautz, Werner, to International Standard Electric Corporation. Doppler VOR. 4,591,861, Cl. 343-404.000.

Kawabe, Tadashi: *See*—
Tanaka, Minoru; Kawabe, Tadashi; and Kobune, Masafumi, 4,591,492, Cl. 423-345.000.

Kawado, Yasuhumi: *See*—
Morishita, Tsuyoshi; Osaki, Sigemi; Sakai, Noriyuki; and Kawado, Yasuhumi, 4,591,480, Cl. 419-9.000.

Kawaguchi, Hideo; Ando, Hideo; and Watanabe, Yasuhiko, to Brother Kogyo Kabushiki Kaisha. Apparatus for continuously forming stitches on a plurality of sewing portions. 4,590,870, Cl. 112-70.000.

Kawahata, Masaichi: *See*—
Hirota, Hisatoshi; Hara, Toyoyuki; and Kawahata, Masaichi, 4,591,677, Cl. 200-83.00J.

Kawai, Hiromasa; Morinaga, Takashi; Miyajima, Hiromu; Akima, Toshio; Kato, Mitsuharu; and Hosoi, Yutaka, to Hitachi Chemical Company, Ltd. Polymers of tricyclo[5.2.1.$0^{2,6}$]deca-8-yl (meth)acrylate. 4,591,626, Cl. 526-282.000.

Kawakami, Kanji: *See*—
Yamada, Kazuji; Kobayashi, Ryoichi; Nagai, Yasuo; Shimizu, Isao; and Kawakami, Kanji, 4,591,780, Cl. 323-313.000.

Kawakami, Shigenobu: *See*—
Sato, Atsushi; Endo, Keiji; Kawakami, Shigenobu; and Dohi, Hideyuki, 4,591,948, Cl. 361-315.000.

Kawakami, Susumu, to Tokyo Shibaura Denki Kabushiki Kaisha. Semiconductor device having a plurality of CMOS I/O cells located at the periphery of the chip arranged in a direction perpendicular to the sides of the chip. 4,591,894, Cl. 357-42.000.

Kawamoto, Hiroshi: *See*—
Shimohigashi, Katsuhiro; Masuda, Hiroo; Ikuzaki, Kunihiko; and Kawamoto, Hiroshi, 4,592,022, Cl. 365-189.000.

Kawamura, Hideaki: *See*—
Nozawa, Ryoichiro; Nagamine, Tsuyoshi; Kawamura, Hideaki; and Fujibayashi, Kentaro, 4,591,771, Cl. 318-569.000.
Nozawa, Ryoichiro; Kawamura, Hideaki; and Miyata, Mitsuto, 4,591,968, Cl. 364-167.000.

Kawamura, Naoto; and Kitajima, Nobuo, to Canon Kabushiki Kaisha. Recording apparatus. 4,591,903, Cl. 358-75.000.

Kawamura, Toshihide; Kashiwabara, Hoichiro; Waki, Osamu; and Sakai, Hiro, to Stanley Electric Co., Ltd. Lamp device for a vehicle mounted on a rear window or the like. 4,591,954, Cl. 362-61.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Fujikawa, Tetsuzo; and Shinichi, Tamba, 4,590,891, Cl. 123-41.110.
Tamba, Shinichi; and Fukui, Noboru, 4,590,890, Cl. 123-41.700.
Yazaki, Mitsuhiro, 4,590,798, Cl. 73-323.000.

Kawasaki Steel Corporation: *See*—
Toyooka, Takaaki, 4,590,781, Cl. 72-181.000.

Kawase, Hirahisa: *See*—
Ohtsubo, Takashi; Kawase, Hirahisa; and Goto, Syunsuke, 4,590,809, Cl. 73-863.530.

Kawase, Jiro; and Tokano, Takao, to KAO Corporation. Shampoo composition. 4,591,498, Cl. 424-70.000.

Kawashima, Hiroki: *See*—
Kurahashi, Osamu; Tsuchida, Takayasu; Kawashima, Hiroki; and Enei, Hitoshi, 4,591,562, Cl. 435-108.000.

Kawashima, Yukio; and Nishijima, Kounosuke, to Mizuno Corporation. Baseball or softball shoe sole. 4,590,693, Cl. 36-126.000.

Kawashiri, Akio: *See*—
Kuboyama, Morio; Harada, Yoshitsugu; Kawashiri, Akio; and Takahashi, Eiji, 4,591,571, Cl. 436-533.000.

Kawata, Yoshihiro; Sakata, Tsunetaka; Matsufuji, Teruo; Inomata, Tetsuro; and Miyashita, Hiroyuki, to Iwasaki Tsushinki Kabushiki Kaisha. Subscriber's circuit for time division switching system. 4,592,046, Cl. 370-58.000.

Kay, Nicholas W.: *See*—
Barth, Edward G.; Braude, Ruvim; and Kay, Nicholas W., 4,591,758, Cl. 313-518.000.

Kayanuma, Akio: *See*—
Ouchi, Norikazu; Kayanuma, Akio; and Asano, Katsuaki, 4,591,398, Cl. 148-187.000.

Keating, David L.: *See*—
Guyer, James M.; Epstein, David I.; and Keating, David L., 4,591,972, Cl. 364-200.000.

Kee, David F.: *See*—
Hicks, Irwin A.; Jacobsen, Robert S.; Kee, David F.; and Schneider, George W., Jr., 4,590,790, Cl. 73-3.000.

Kee, Harry: *See*—
Thouret, Wolfgang E.; Kaufman, Rudolph; and Kee, Harry, 4,591,752, Cl. 313-25.000.

Keilberth, Richard: *See*—
Aldinger, Fritz; Keilberth, Richard; and Werdecker, Waltraud, 4,591,537, Cl. 428-698.000.

Keillor, Robert D.: *See*—
Gaebelein, Georg, deceased; Bhend, Richard B.; Keillor, Robert D.; Lovgren, Jeffrey L.; and Mercer, John R., 4,591,727, Cl. 250-578.000.

Keim, George F. Golfer's glove. 4,590,625, Cl. 2-161.00A.

Keiper Recaro Inc.: *See*—
Nithammer, Egon; Ligensa, Karl H.; and Kresky, Fred C., 4,591,207, Cl. 297-366.000.

Kelemen, Donald D.: *See*—
Amstutz, Douglas D.; and Kelemen, Donald D., 4,591,058, Cl. 211-94.000.

Kelemen, Janice J.: *See*—
Olsen, William L.; Freeborn, John O.; Shaver, Linnea J.; and Kelemen, Janice J., 4,591,485, Cl. 422-20.000.

Kelly, Thomas L. Concentric loading vulcanizer and method of vulcanizing. 4,591,329, Cl. 425-340.000.

Kelman, Charles D. Intraocular lens. 4,591,358, Cl. 623-6.000.

Kelso, David P.: *See*—
Gunderson, Jon; Kelso, David P.; and Vanderheiden, Gregg, 4,591,841, Cl. 340-707.000.

Kemper, Hermanus C.: *See*—
Goedhart, Machiel; Gortemaker, Franciscus H.; Kemper, Hermanus C.; and Kielman, Hendrik S., 4,591,448, Cl. 252-99.000.
Goedhart, Machiel; Gortemaker, Franciscus H.; Kemper, Hermanus C.; and Kielman, Hendrik S., 4,591,449, Cl. 252-99.000.

Kemstedt, Clas A., to Telefonaktiebolaget LM Ericsson. Method of securely interrupting the electric power supply from a low-frequency or direct voltage source to a load, and appartus for carrying out the method. 4,591,964, Cl. 363-24.000.

Kendall, James M.: *See*—
Mattes, Donald A.; Landry, Steven G.; and Kendall, James M., 4,591,967, Cl. 364-132.000.

Kennings, Kenneth L. Capless container. 4,591,074, Cl. 222-153.000.

Kent, Stephen J.: *See*—
Proulx, Richard W.; and Kent, Stephen J., 4,590,840, Cl. 86-10.000.

Kenyon, J. Stephen. Decorative lighting fixture. 4,591,959, Cl. 362-252.000.

Keramik Holding AG Laufen: *See*—
Gerster, Thomas, 4,591,472, Cl. 264-87.000.

Kerb, Ulrich; Sauer, Gerhard; Wiechert, Rudolf; Henderson, David; Nishino, Yukishige; and Beier, Sybille, to Schering Aktiengesellschaft. 1-alkyl-androsta-1,4-diene-3,17-diones their production and pharmaceutical preparations containing same. 4,591,585, Cl. 514-177.000.

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Heckmann, Klaus; and Spurny, Jiri, 4,591,488, Cl. 423-11.000.
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Giltzow, J. Hunter, 4,591,013, Cl. 177-230.000.

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Kang, Uan G.; Bush, Richard W.; Ketley, Arthur D.; and Ferrin, Clifford A., Jr., 4,591,522, Cl. 428-419.000.

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Kintz, Arthur H.; and Vranizan, John M., 4,590,978, Cl. 144-174.000.

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Kidde, Inc.: *See*—
Walter, Carl W.; and Woodworth, John L., 4,591,049, Cl. 206-222.000.

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Goedhart, Machiel; Gortemaker, Franciscus H.; Kemper, Hermanus C.; and Kielman, Hendrik S., 4,591,448, Cl. 252-99.000.
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Kikuya, Satoshi; Minamide, Seiko; and Shibaike, Narito, to Matsushita Electric Industrial Co., Ltd. Tape cassette pivotal cover locking arrangement. 4,591,936, Cl. 360-132.000.
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Outsuka, Shuichi; and Kimura, Akinori, 4,591,543, Cl. 430-125.000.
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Urabe, Hitoshi; and Kimura, Hideaki, 4,591,923, Cl. 358-284.000.
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Plowman, John S., 4,590,706, Cl. 49-57.000.
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Kirst, Karl O. R., to Ace Controls, Inc. Hydraulic shock absorber with two-way action. 4,591,031, Cl. 188-287.000.
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Fuji, Masaaki; Izumi, Yuichi; and Kitaguchi, Hiroshi, 4,591,720, Cl. 250-362.000.
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Kawamura, Naoto; and Kitajima, Nobuo, 4,591,903, Cl. 358-75.000.
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Kitaoka, Teruhiko; and Matsumoto, Hajime, to Toybox Corporation. Movie projector pendant. 4,591,238, Cl. 353-122.000.
Kitchens, Roy A.: *See*—
Cusey, Dar L.; and Kitchens, Roy A., 4,591,868, Cl. 343-903.000.
Kitchman, Fern E., to Blue Bell, Inc. Electrostatic dissipative garment. 4,590,623, Cl. 2-85.000.
Kitsunai, Tomoyuki; Saito, Kiyotaka; and Hori, Shozo, to Denki Kagaku Kogyo Kabushiki Kaisha. Process for producing an iminated copolymer. 4,591,619, Cl. 525-285.000.
Kiya, Nobuyuki: *See*—
Nozawa, Ryoichiro; and Kiya, Nobuyuki, 4,591,990, Cl. 364-474.000.
Klein, Gerald B. Safety fish landing hook. 4,590,700, Cl. 43-5.000.
Klein, Harvey A. Tools for orthopaedic surgery and the like. 4,590,929, Cl. 128-92.00E.
Klein, Joseph T.: *See*—
Davis, Larry; and Klein, Joseph T., 4,591,586, Cl. 514-211.000.
Klemola, Jorma J., to O/Y Kyro A/B Tamglass. Apparatus for equalizing the temperature of conveyor rolls in a glass-tempering furnace. 4,591,374, Cl. 65-350.000.
Klima, Dennis P.; and Pakel, John E., to Control Energy Corporation. Energy cost allocation method and system. 4,591,988, Cl. 364-464.000.
Klima, Hubertus; and Jekat, Herbert, to SKW Trostberg Aktiengesellschaft. Process for obtaining solid cyanuric chloride. 4,591,493, Cl. 423-383.000.
Klimovich, Elena I.: *See*—
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Knabel, Siegfried: *See*—
Leykamm, Herbert; and Knabel, Siegfried, 4,590,782, Cl. 72-354.000.
Knapp, Todd K.: *See*—
Mikulecky, Harvey W.; and Knapp, Todd K., 4,591,816, Cl. 335-6.000.
Knirck, Jeffrey G.: *See*—
Tucker, Hartwell F.; Tucker, Jeffrey R.; Ross, Dennis; and Knirck, Jeffrey G., 4,590,635, Cl. 15-50.00R.
Knodler, Helmut: *See*—
Lang, Armin; and Knodler, Helmut, 4,590,965, Cl. 137-596.000.
Knoll International, Inc.: *See*—
Reuter, Robert E.; and Markus, Isidoro N., 4,591,214, Cl. 312-110.000.
Knoll, Jozsef: *See*—
Tyihak, Erno; Mincsovics, Emil; Knoll, Jozsef; Zoltan, Sandor; Lak, Istvan; Tetenyi, Peter; Kalasz, Huba; and Nagy, Janos, 4,591,524, Cl. 428-167.000.
Knop, Karl H.: *See*—
Heeb, Egon J.; Knop, Karl H.; and Morf, Rudolf H., 4,591,900, Cl. 358-44.000.
Kobayashi, Kenkichiro, to Semiconductor Energy Laboratory Co., Ltd. Electrolytic solution for a redox system. 4,591,453, Cl. 252-182.100.
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DeQuattro, Vincent; and Kobayashi, Kiyoshi, 4,591,551, Cl. 435-15.000.
Kobayashi, Masahito: *See*—
Hagiwara, Yoshimune; Sugiyama, Shizuo; Maeda, Narimichi; Yumoto, Osamu; Akazawa, Takashi; Kobayashi, Masahito; Kita, Yasuhiro; and Kita, Yuzo, 4,592,006, Cl. 364-748.000.
Kobayashi, Ryoichi: *See*—
Yamada, Kazuji; Kobayashi, Ryoichi; Nagai, Yasuo; Shimizu, Isao; and Kawakami, Kanji, 4,591,780, Cl. 323-313.000.
Kobayashi, Satoru: *See*—
Miyata, Seizo; and Kobayashi, Satoru, 4,591,616, Cl. 525-185.000.
Kobayashi, Shoichi: *See*—
Kainuma, Keiji; and Kobayashi, Shoichi, 4,591,560, Cl. 435-96.000.
Kobayashi, Sumio, to Sumitomo Metal Industries, Ltd. Electromagnetic stirrer. 4,590,989, Cl. 164-504.000.
Kobayashi, Tadahiko; Sahashi, Masashi; Inomata, Koichiro; Domon, Tomokazu; and Fukuda, Hironori, to Kabushiki Kaisha Toshiba. Torque sensor of noncontact type. 4,590,807, Cl. 73-862.360.
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Kurauchi, Makoto; Kobayashi, Takeshi; Izumi, Masakazu; and Aota, Jiro, 4,590,724, Cl. 52-223.00L.
Kobayashi, Toshio: *See*—
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Koble, Robert L., Jr. Hose connector adapter apparatus for evaporative cooler float valve. 4,590,960, Cl. 137-315.000.
Kobori, Yasunori: *See*—
Miura, Kuniaki; Kobori, Yasunori; Fukushima, Isao; Shiomi, Makoto; and Kano, Kenji, 4,591,798, Cl. 329-102.000.
Kobune, Masafumi: *See*—
Tanaka, Minoru; Kawabe, Tadashi; and Kobune, Masafumi, 4,591,492, Cl. 423-345.000.
Koch, Dieter; and Noller, Friedemann, to Institut fur Kerntechnik und Energiewandlung e.v. System and method for processing a work piece by a focussed electron beam. 4,591,688, Cl. 219-121.0EV.
Koch, Robert E. Compact level. 4,590,682, Cl. 33-383.000.
Koechner, Walter; and Buser, Rudolf G. Optical fiber security system. 4,591,709, Cl. 250-221.000.
Kohnen, Klaus; and Ullrich, Norbert, to Krupp-Koppers GmbH. Pin for holding and/or cooling of ceramic coatings in hot reaction chambers. 4,590,867, Cl. 110-336.000.
Kohner, Michael, to Michael Kohner Corp., The. Confined animation figure toy. 4,591,345, Cl. 446-361.000.
Kohtani, Yutaka: *See*—
Kaneda, Naoya; Toyama, Masamichi; Kozuki, Susumu; Kohtani, Yutaka; and Fujiwara, Akihiro, 4,591,919, Cl. 358-227.000.
Koide, Hiroshi, to Ricoh Company, Ltd. Control system for reciprocating drive motor. 4,591,767, Cl. 318-314.000.
Koike, Hideharu, to Tokyo Shibaura Denki Kabushiki Kaisha. Transition detection circuit. 4,591,744, Cl. 307-518.000.
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Yoshihara, Tetsuya, 4,591,080, Cl. 222-598.000.
Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
Mizuguchi, Yoshihiko; and Watanabe, Fumio, 4,591,866, Cl. 343-781.00P.
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Kurita, Tokutaro, 4,591,196, Cl. 292-336.300.
Kolb, Albert: *See*—
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Kolitsch, Jorg; and Miehle, August, to Bayerische Motoren Werke AG. Examination procedure for the spatial change of an object with respect to its initial condition. 4,591,784, Cl. 324-208.000.
Kollenz, Erich, to Voest-Alpine Aktiengesellschaft. Apparatus for producing gas-permeable pressed articles. 4,591,325, Cl. 425-233.000.
Koller, David C.: *See*—
Gruchalla, Michael E.; and Koller, David C., 4,591,941, Cl. 361-42.000.
Kollmorgen Technologies Corp.: *See*—
Brown, David C., 4,591,987, Cl. 364-458.000.
Kolt, Stanley, to Suroff, Leonard W., a part interest. Energy saver damper assembly. 4,591,092, Cl. 236-49.000.

Koltookian, Sarkis A.: *See*—
Bernard, Jerald D.; and Koltookian, Sarkis A., 4,591,129, Cl. 251-64.000.

Komadina, Bruce M.; Lazarevich, Vladeta D.; and Beining, August H., to Electro Mechanical Systems, Inc.; and Hughes Aircraft Company. Ambient light and electromagnetic noise reduction circuit. 4,591,710, Cl. 250-221.000.

Komatsu, Shigeru; and Hirahata, Shigeru, to Hitachi, Ltd. Character and graphic signal generating apparatus. 4,591,845, Cl. 340-745.000.

Komori, Nobutoshi: *See*—
Suzuki, Takeshi; and Komori, Nobutoshi, 4,591,633, Cl. 528-485.000.

Konczalski, Ronald L., to Moco Thermal Industries. Oven for curing resin-coated wires. 4,591,336, Cl. 432-59.000.

Konetzka, Jurgen: *See*—
Finke, Robert-Gunter; Schumacher, Clemens; Kolb, Albert; Lautenschlager, Horst; and Konetzka, Jurgen, 4,591,050, Cl. 206-222.000.

Kongoh, Takashi: *See*—
Makabe, Hachiro; Tanaka, Haruhiko; and Kongoh, Takashi, 4,590,880, Cl. 112-445.000.

Konig, Helmut. Baking oven. 4,590,916, Cl. 126-21.00A.

Konishi, Satoshi, to Tokyo Shibaura Denki Kabushiki Kaisha. Memory device. 4,592,028, Cl. 365-230.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Fujimaki, Yoshihide; Kudo, Koichi; Takei, Yoshiaki; and Nomori, Hiroyuki, 4,591,542, Cl. 430-59.000.
Matsuzaka, Syoji; Kajiwara, Makoto; Miyoshi, Masanobu; and Yamashita, Kiyoshi, 4,591,549, Cl. 430-569.000.
Sasa, Nobumasa; Sato, Yuzuru; Ohta, Tatsuo; and Shindo, Masanari, 4,591,544, Cl. 430-166.000.
Sawano, Hiroshi, 4,591,257, Cl. 354-403.000.

Konotsune, Shiro: *See*—
Kunimune, Kouichi; Kutsuzawa, Yoshiya; and Konotsune, Shiro, 4,591,653, Cl. 556-419.000.

Koo, Kee P.; and Sigel, George H., Jr., to United States of America, Navy. Fiber-optic magnetic gradiometer with variable magnetic biasing fields. 4,591,786, Cl. 324-244.000.

Koos, William M., Jr.; Geis, Timothy R.; and Rudy, Richard M., Jr., to Burroughs Corp. Real time cell specification processor. 4,591,846, Cl. 340-748.000.

Kopernicky, Jaroslav J., to Mapro Inc. Method for removing moisture and volatiles from molding particulate plastic material feed. 4,591,467, Cl. 264-37.000.

Kopp, Gregory M.: *See*—
Katerberg, James A.; Kopp, Gregory M.; and Piatt, Michael J., 4,591,869, Cl. 346-1.100.

Kopp, Paul J. Alignment gauge for scriber tool. 4,590,677, Cl. 33-42.000.

Koret, Inc.: *See*—
Gordon, Michael; and Curreri, John R., 4,591,183, Cl. 280-655.000.

Kornaker, Walter, to ITT Industries, Inc. Cathode-ray tube with magnetic ring. 4,591,755, Cl. 313-412.000.

Korppoo, Seppo; and Landtman, Martin, to Oy Wartsila AB. Wheel propulsion device for air cushion vehicle. 4,591,015, Cl. 180-119.000.

Kosaka, Takeshi: *See*—
Miyata, Seizo; Tasaka, Shigeru; Saito, Kazuo; Seo, Iwao; Nakajima, Kenji; and Kosaka, Takeshi, 4,591,465, Cl. 264-22.000.

Kossuth, Donald A.: *See*—
Schneller, Joseph W.; Kossuth, Donald A.; and Robinson, J. Stephen, 4,590,733, Cl. 52-741.000.

Kosuzume, Hiroshi: *See*—
Ohnishi, Haruo; Kosuzume, Hiroshi; Suzuki, Yasuo; and Mochida, Ei, 4,591,504, Cl. 424-94.000.

Kouda, Kazuo, to Victor Company of Japan, Limited. Idler drive mechanism with positional control. 4,591,935, Cl. 360-96.300.

Koumura, Ichiro; Kanou, Hideo; Okunishi, Masahiko; and Yamada, Kazuhiko, to Ajinomoto Co., Inc. Rapid method for detecting microorganisms. 4,591,554, Cl. 435-18.000.

Kovach, Stephen M.; and Miller, Charles B., to Ashland Oil, Inc. Cascading of fluid cracking catalysts. 4,591,425, Cl. 208-74.000.

Kovacs, Antal; Erdei, Janos; Kovats, Karoly; Polya, Laszlo ; Pasztor, Karoly; Nagy, Janos; Pepo , Pal; Pepo , Peter; Kiss, Gyorgy; and Kajati, Istvan, to Biogal Gyogyszergyar. Plant growth regulators. 4,591,379, Cl. 71-94.000.

Kovats, Karoly: *See*—
Kovacs, Antal; Erdei, Janos; Kovats, Karoly; Polya, Laszlo ; Pasztor, Karoly; Nagy, Janos; Pepo , Pal; Pepo , Peter; Kiss, Gyorgy; and Kajati, Istvan, 4,591,379, Cl. 71-94.000.

Kowal, Steven J.; and Lesher, Kenneth W., to Stanadyne, Inc. Self-contained lash adjuster with shell mounted cartridge assembly. 4,590,899, Cl. 123-90.580.

Koyo Machine Industries Company: *See*—
Sugiyama, Yasuo; So, Masaomi; Hamaguchi, Ichiro; and Maeda, Kenichi, 4,590,712, Cl. 51-161.000.

Koyo Seike Company Limited: *See*—
Sugiyama, Yasuo; So, Masaomi; Hamaguchi, Ichiro; and Maeda, Kenichi, 4,590,712, Cl. 51-161.000.

Kozol, Eugene T.: *See*—
Bloom, Robert D.; Burke, Edward J.; and Kozol, Eugene T., 4,591,969, Cl. 364-183.000.

Kozuki, Susumu: *See*—
Kaneda, Naoya; Toyama, Masamichi; Kozuki, Susumu; Kohtani, Yutaka; and Fujiwara, Akihiro, 4,591,919, Cl. 358-227.000.

Kraftwerk Union Aktiengesellschaft: *See*—
Goebel, Konrad; Muller, Rainer; and Schiffers, Ulrich, 4,590,760, Cl. 60-39.120.

Krahmer, Hansjorg; Rusch, Reinhart; Kruger, Hans-Rudolf; and Sjut, Volkert, to Schering Aktiengesellschaft. 1,2,3-thiadiazol-3-in-5-yli-dene-urea derivatives, methods for the production of these compounds as well as compositions containing the same and having growth-regulatory and defoliating activity. 4,591,376, Cl. 71-90.000.

Krahmer, Hansjorg: *See*—
Kerb, Ulrich; Eder, Ulrich; and Krahmer, Hansjorg, 4,591,650, Cl. 549-268.000.

Krantz, Lawrence L.: *See*—
Wade, Donald A.; Wagner, Eric M.; Krantz, Lawrence L.; and Goodman, R. W., 4,591,975, Cl. 364-200.000.

Krasuk, Julio H.; Silva, Fernando J.; Galiasso, Roberto E.; and Souto, Alfredo, to Intevep, S.A. Process for hydroconversion and upgrading of heavy crudes of high metal and asphaltene content. 4,591,426, Cl. 208-96.000.

Kraus, Willibald, to TRW United-Carr GmbH. Pipe support. 4,591,119, Cl. 248-74.200.

Krause, Norbert, to Siemens Aktiengesellschaft. High-frequency device containing a surface coil for nuclear spin resonance apparatus. 4,590,947, Cl. 128-653.000.

Krebs, Karl-Heinz: *See*—
Hain, Gottfried; and Krebs, Karl-Heinz, 4,590,833, Cl. 83-367.000.

Kreeger, Ken; and Tank, Gene, to Nordson Corporation. Portable powder spray system. 4,590,884, Cl. 118-308.000.

Kregness, Glen R., to Sperry Corporation. Masked arithmetic logic unit. 4,592,005, Cl. 364-736.000.

Kremer, Stephen H. Wire dispensing multi-spool protective holder. 4,591,109, Cl. 242-129.000.

Kresky, Fred C.: *See*—
Nithammer, Egon; Ligensa, Karl H.; and Kresky, Fred C., 4,591,207, Cl. 297-366.000.

Kreuzer, Friedhelm. Support structure with a support arm pivotal for height adjustment. 4,591,122, Cl. 248-280.100.

Krevet, Berthold; Schauer, Wolfgang; and Wuchner, Fritz, to Kernforschungszentrum Karlsruhe GmbH. Process for the preparation of superconducting compound materials. 4,591,509, Cl. 427-62.000.

Krey, Walter, to AURORA Konrad G. Schulz GmbH & Co. Arrangement of control members, especially for apparatus for heating and ventilating driver's cabs, passenger compartments, etc. in commercial vehicles. 4,591,153, Cl. 237-12.30R.

Kromrey, Robert V., to United Technologies Corporation. Constant pressure end burning gas generator. 4,590,860, Cl. 102-289.000.

Kronhaus, Howard E.: *See*—
Rosenthal, Henry; and Kronhaus, Howard E., 4,590,737, Cl. 53-211.000.

Krude, Werner: *See*—
Balken, Jochen; Krude, Werner; and Orain, Michel A., 4,591,212, Cl. 301-105.00R.

Krug, Russell R.; and Pettersen, Frederick A., to Chevron Research Company. Method for vapor recovery for fluidized catalytic cracking processes. 4,591,427, Cl. 208-161.000.

Kruger, Hans-Rudolf: *See*—
Krahmer, Hansjorg; Rusch, Reinhart; Kruger, Hans-Rudolf; and Sjut, Volkert, 4,591,376, Cl. 71-90.000.

Kruger, Tilmann; Arnold, Werner; and Scheumann, Leonhard, to Diehl GmbH & Co. Transformerless power unit. 4,591,728, Cl. 307-75.000.

Krupp-Koppers GmbH: *See*—
Kohnen, Klaus; and Ullrich, Norbert, 4,590,867, Cl. 110-336.000.
Wohner, Hans J.; Pappmann, Wilfried; and Diemer, Peter, 4,591,366, Cl. 55-20.000.

Kubala, Gregory, to Dowell Schlumberger Incorporated. Aqueous gelling and/or foaming agents for aqueous acids and methods of using the same. 4,591,447, Cl. 252-8.55C.

Kubo, Akira; Nishizaki, Kan; and Okado, Yasuomi, to Shinto Paint Co., Ltd. Method for producing water-dispersible compositions. 4,591,609, Cl. 523-336.000.

Kubota, Atsushi, to Okawara Mfg. Co., Ltd. Granulating apparatus. 4,591,324, Cl. 425-222.000.

Kubota, Shigeo; and Shintani, Kenji, to Sony Corporation. Optical reproducing apparatus. 4,592,038, Cl. 369-44.000.

Kubota, Yuichi: *See*—
Nishimatsu, Masaharu; Ide, Toshiaki; Kubota, Yuichi; Saito, Yoshiaki; and Arioka, Hiroyuki, 4,591,528, Cl. 428-212.000.

Kuboyama, Morio; Harada, Yoshitsugu; Kawashiri, Akio; and Takahashi, Eiji, to Morinaga Milk Industry Co., Ltd. Fine carrier particles sensitized with acylated antibody for antigen detection. 4,591,571, Cl. 436-533.000.

Kuboyama, Nobuyoshi. Heat generating apparatus by use of multistage rotary means. 4,590,918, Cl. 126-247.000.

Kucherer, Harvey D.: *See*—
Cooper, Frank W., Jr.; Epperson, Thomas M.; Calhoun, Gregory L.; and Kucherer, Harvey D., 4,590,991, Cl. 165-69.000.

Kudelski S.A.: *See*—
Kudelski, Stefan, 4,591,768, Cl. 318-327.000.

Kudelski, Stefan, to Ampex Corporation; and Kudelski S.A. Control system for an electric motor. 4,591,768, Cl. 318-327.000.

Kudo, Hisashi: *See*—
Urabe, Hitoshi; Matsumoto, Masayuki; Kudo, Hisashi; and Shimazaki, Osamu, 4,591,904, Cl. 358-75.000.

Kudo, Koichi: *See*—
Fujimaki, Yoshihide; Kudo, Koichi; Takei, Yoshiaki; and Nomori, Hiroyuki, 4,591,542, Cl. 430-59.000.

Kuhn, Heinz, to Continental Gummi-Werke Aktiengesellschaft. Variable-width-base solid tire for assuring seated rim mounting on vehicle wheels and the like. 4,590,980, Cl. 152-323.000.

Kuhn S.A.: *See*—
Weber, Andre , 4,590,981, Cl. 164-112.000.

KUKA Wehrtechnik GmbH: *See*—
Huber, Wolfgang, 4,590,843, Cl. 89-45.000.

Kulicke and Soffa Industries Inc.: *See*—
Frasch, Eugene W., 4,591,087, Cl. 228-110.000.

Kumabe, Hisao; Sogo, Toshio; and Takamiya, Saburo, to Mitsubishi Denki Kabushiki Kaisha. Transverse junction stripe laser with steps at the end faces. 4,592,061, Cl. 372-45.000.

Kumagai, Shinobu: *See*—
Honda, Akira; Yanagihashi, Yasuo; and Kumagai, Shinobu, 4,590,985, Cl. 164-440.000.

Kumamoto, Kenichiro: *See*—
Ouchi, Koji; Tsurumaru, Shinobu; Kajiwara, Tadashi; and Kumamoto, Kenichiro, 4,592,093, Cl. 455-4.000.

Kumm, Emerson L. Variable ratio pulleys for flat belt transmission system. 4,591,351, Cl. 474-49.000.

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Oetiker, Hans; and Kummer, Emanuel, 4,590,795, Cl. 73-73.000.

Kung, David, to National Semiconductor Corporation. Temperature compensated current sensing circuit. 4,591,743, Cl. 307-491.000.

Kunimune, Kouichi; Kutsuzawa, Yoshiya; and Konotsune, Shiro, to Chisso Corporation. Silicone-polyimide precursor and process for producing same. 4,591,653, Cl. 556-419.000.

Kunz, Harold R., to United Technologies Corporation. Binary electrolyte for molten carbonate fuel cells. 4,591,538, Cl. 429-16.000.

Kunze, Manfred C. Remote calibrator. 4,590,789, Cl. 73-1.00G.

Kuo, Calven, to Aurora Mechatronics Corp. Answer bar of a calculator. 4,591,703, Cl. 235-145.00R.

Kuo, Youti; and Young, Dale W., to Xerox Corporation. Tri-pass baffle decurler. 4,591,259, Cl. 355-3.0SH.

Kuperman, Gilbert G.; and Wallquist, Donald L., to United States of America, Air Force. Dynamic bar pattern method. 4,591,998, Cl. 364-521.000.

Kurahashi, Osamu; Tsuchida, Takayasu; Kawashima, Hiroki; and Enei, Hitoshi, to Ajinomoto Company Incorporated. Method for producing L-phenylalanine by fermentation. 4,591,562, Cl. 435-108.000.

Kurauchi, Makoto; Kobayashi, Takeshi; Izumi, Masakazu; and Aota, Jiro, to Shinko Kosen Kogyo Kabushiki Kaisha. Anchorage for steel wire strand for prestressed concrete. 4,590,724, Cl. 52-223.00L.

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Hori, Saburo, 4,591,471, Cl. 264-60.000.

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Iwamoto, Shigeyoshi; Saeki, Yoshifumi; Kuribayashi, Takashi; Ishitsuka, Shinichiro; and Ogino, Nobukuni, 4,591,951, Cl. 361-417.000.

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Kuroda, Hideo; and Mukawa, Naoki, to Nippon Telegraph & Telephone Public Corp. Interframe coding method and apparatus therefor. 4,591,909, Cl. 358-136.000.

Kuroyanagi, Junzo: *See*—
Uriuhara, Makoto; and Kuroyanagi, Junzo, 4,590,906, Cl. 123-339.000.

Kurth, Lloyd A.; and Blaha, J. David, to Kurth, Lloyd A. Fixation device and process for an intramedullary nail. 4,590,930, Cl. 128-92.0BC.

Kurzweg, Ulrich H., to University of Florida. Heat transfer device for the transport of large conduction flux without net mass transfer. 4,590,993, Cl. 165-104.310.

Kuse, Kazuma: *See*—
Matsuno, Kenji; and Kuse, Kazuma, 4,591,686, Cl. 219-81.000.

Kusumoto, Koshi: *See*—
Okabayashi, Minahiro; Yuasa, Shigeki; and Kusumoto, Koshi, 4,591,575, Cl. 501-154.000.

Kutsuzawa, Yoshiya: *See*—
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Kuxma, Janusz: *See*—
Iwaszkiewicz, Jerzy G.; and Kuxma, Janusz, 4,590,950, Cl. 128-786.000.

Kuyava, Charles C.: *See*—
Porter, Christopher H.; and Kuyava, Charles C., 4,590,927, Cl. 128-79.000.

Kyle, William F., to Argus Systems, Inc. Intrusion detecting apparatus with zone identification and with noise interference discrimination. 4,591,834, Cl. 340-566.000.

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Gaskell, Philip S.; Lagadec, Roger; and McNally, Guy W. W., 4,591,926, Cl. 360-13.000.

Lahr, Roy J. Modular patchboard for electrical devices. 4,591,949, Cl. 361-394.000.

Lai, Stephen H.; and Srivastava, Gopal K., to Zenith Electronics Corporation. Horizontal picture centering. 4,591,910, Cl. 358-148.000.

Lak, Istvan: *See*—
Tyihak, Erno; Mincsovics, Emil; Knoll, Jozsef; Zoltan, Sandor; Lak, Istvan; Tetenyi, Peter; Kalasz, Huba; and Nagy, Janos, 4,591,524, Cl. 428-167.000.

Lamboo, Theodorus F., to U.S. Philips Corporation. Ultraviolet irradiation panel. 4,591,958, Cl. 362-219.000.

Lancaster, Janet M.: *See*—
Atkinson, Alan W.; Dearden, Katryna J.; Doyle, Christina; Lancaster, Janet M.; Marshall, Kenneth H.; and Robinson, Kay L., 4,591,166, Cl. 277-1.000.

LandAire DynaBrake, Inc.: *See*—
Rapoport, Uri, 4,591,213, Cl. 303-93.000.

Landry, Steven G.: *See*—
Mattes, Donald A.; Landry, Steven G.; and Kendall, James M., 4,591,967, Cl. 364-132.000.

Landtman, Martin: *See*—
Korppoo, Seppo; and Landtman, Martin, 4,591,015, Cl. 180-119.000.

Lang, Armin; and Knodler, Helmut, to Zahnradfabrik Friedrichshafen, AG. Pressure agent control arrangement for auxiliary power steering mechanisms. 4,590,965, Cl. 137-596.000.

Langenegger, Urs: *See*—
Rutsche, Wendolin; and Langenegger, Urs, 4,590,865, Cl. 108-1.000.

Langer, Robert: *See*—
Cohen, Jonathan M.; Siegel, Ronald; and Langer, Robert, 4,591,496, Cl. 424-15.000.

Langner, Carl: *See*—
Poran, Michael; Langner, Carl; and Karolyi, Stephen, 4,590,984, Cl. 164-426.000.

Languillat, Jean-Paul, to Lhomme S.A. Apparatus for truncating continuously formed tubes. 4,591,405, Cl. 156-446.000.

Laporte Industries Limited: *See*—
Crampton, John R.; and Whiting, Howard, 4,591,581, Cl. 502-407.000.

Lark, Jay S.: *See*—
Bennett, James S.; and Lark, Jay S., 4,591,983, Cl. 364-403.000.

Larrabee, Graydon B.: *See*—
Ziem, Eva A.; Larrabee, Graydon B.; and Witter, David E., 4,591,409, Cl. 156-605.000.

Larsen, John R.: *See*—
Howard, Robert; Helinski, Richard R.; Larsen, John R.; and Menhennett, Herbert E., 4,591,281, Cl. 400-126.000.

Larson, David L., to Pfizer Inc. 2-guanidino-4-(2-methyl-4-imidazolyl)-thiazoles in the treatment of rheumatoid arthritis. 4,591,595, Cl. 514-367.000.

Larson, Ray E., to Power Controls Corporation. Variable control circuit having a predetermined timed output. 4,591,781, Cl. 323-323.000.

Laser Precision Corporation: *See*—
Doyle, Walter M., 4,591,266, Cl. 356-244.000.

Lassila & Tikanoja Oy: *See*—
Randen, Ilkka, 4,591,200, Cl. 294-96.000.

Laude, Jean-Pierre, to Instruments SA. Coupler extracting an optical signal. 4,591,237, Cl. 350-96.150.

Laughter, Joseph S., to University of Tennessee Research Corporation. Thermal navigator. 4,591,111, Cl. 244-75.00R.

Laughton, William J., to General Electric Company. Integratable circuit for controlling turn-off voltage rate-of-change of non-regenerative voltage-controlled switching semiconductor devices. 4,591,734, Cl. 307-248.000.

Lautenschlager, Gerhard W.: *See*—
Lautenschlager, Karl; Lautenschlager, Horst; and Lautenschlager, Gerhard W., 4,590,641, Cl. 16-238.000.

Lautenschlager, Horst: *See*—
Finke, Robert-Gunter; Schumacher, Clemens; Kolb, Albert; Lautenschlager, Horst; and Konetzka, Jurgen, 4,591,050, Cl. 206-222.000.
Lautenschlager, Karl; Lautenschlager, Horst; and Lautenschlager, Gerhard W., 4,590,641, Cl. 16-238.000.

Lautenschlager, Karl; Lautenschlager, Horst; and Lautenschlager, Gerhard W., to Mepla, Inc. Adjustable crosslink hinge. 4,590,641, Cl. 16-238.000.

LaValliere, Wayne: *See*—
Schommer, David L.; and LaValliere, Wayne, 4,590,855, Cl. 101-157.000.

Lazarevich, Vladeta D.: *See*—
Komadina, Bruce M.; Lazarevich, Vladeta D.; and Beining, August H., 4,591,710, Cl. 250-221.000.

LEA Dynatech Inc.: *See*—
Carpenter, Roy B., Jr.; and Drabkin, Mark, 4,591,779, Cl. 323-301.000.

LeaRonal, Inc.: *See*—
Whitlaw, Keith J., 4,591,415, Cl. 204-15.000.

Le Bigot, Yves: *See*—
Delmas, Michel; Gaset, Antoine; and Le Bigot, Yves, 4,591,651, Cl. 549-473.000.

Lee, Lin-Shan; Chou, Ger-Chih; and Chang, Ching-Sung. Frequency or time domain speech scrambling technique and system which does not require any frame synchronization. 4,591,673, Cl. 179-1.50R.

Leep, Oral F.: *See*—
Bauer, Claude J.; Dellinger, Vernon D.; and Leep, Oral F., 4,591,658, Cl. 174-65.00R.

Leerschool, Joseph F. M.; and Dols, Hubert J., to Stamicarbon B.V. Method and installation for the preparation of melamine. 4,591,644, Cl. 544-201.000.

Leggett & Platt, Incorporated: *See*—
James, Ronald O., 4,591,205, Cl. 297-85.000.

Legros, Michel; and Montenot, Jean, to Horlogerie Photographique Francaise. Telephone set-computer terminal assembly with a single decimal keyboard and a switchable local power supply. 4,591,662, Cl. 179-2.0DP.

Lehner, Attila. Whirligig. 4,591,159, Cl. 273-138.00R.
Leibowitz, Joseph D., to TRW Inc. Multilayer printed circuit board structure. 4,591,659, Cl. 174-68.500.
Leif Ernryd AB: *See—*
Ernryd, Leif W.; Carbol, Vlastimil; and Carbol, Paul, 4,591,437, Cl. 210-265.000.
Leigh-Monstevens, Keith V., to Automotive Products plc. Hydraulic cylinder modular structure. 4,590,765, Cl. 60-585.000.
Lemelson, Jerome H.; and Grund, Christian. Record card transducing apparatus and method. 4,592,042, Cl. 369-258.000.
Lenclos, Jean-Francois: *See—*
Beaubatie, Jean; Cavarec, Francois; Lenclos, Jean-Francois; and Paris, Marc, 4,590,797, Cl. 73-295.000.
Lenhard-Backhaus, Hugo; and Kauer, Erhard, to Steyr-Daimler-Puch Aktiengesellschaft. Cardan shaft drive for a transmission, particularly for the distribution transmission of a motor vchicle with all-wheel drive. 4,591,349, Cl. 464-136.000.
Leonard, George H. Spring mechanisms. 4,591,136, Cl. 267-154.000.
Leonardi, Alfio, to Nordica S.p.A. Rear entrance ski boot structure with constant flex. 4,590,692, Cl. 36-120.000.
Leone-Bay, Andrea; and Timony, Peter E., to Stauffer Chemical Company. Herbicidal esters of 2-bromo-4-methylimidazole-5-carboxylic acid. 4,591,377, Cl. 71-92.000.
Lesher, Kenneth W.: *See—*
Kowal, Steven J.; and Lesher, Kenneth W., 4,590,899, Cl. 123-90.580.
Levallois, Emile; Szabo, Rene; Clot, Jean; and Esteve, Daniel, to Institut Francais du Petrole. Method and device for placing in a determined relative position two elements submerged in a conducting liquid medium. 4,591,293, Cl. 405-170.000.
Lever Brothers Company: *See—*
Bodor, Janos; Heslinga, Lammert; van Heteren, Jan; and de Vries, Bartholomeus, 4,591,507, Cl. 426-604.000.
Goedhart, Machiel; Gortemaker, Franciscus H.; Kemper, Hermanus C.; and Kielman, Hendrik S., 4,591,448, Cl. 252-99.000.
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Levitt, George, to Du Pont de Nemours, E. I., and Company. Agricultural sulfonamides. 4,591,378, Cl. 71-93.000.
Lew, Hyok S.; and Stranahan, Mike. Sky-slide emergency escape system. 4,591,021, Cl. 182-10.000.
Lew, Hyok S. Accumulative absorption-dispersion spectrophotometer. 4,591,268, Cl. 356-338.000.
Lewyn, Lanny L.: *See—*
Lucas, Charles H.; and Lewyn, Lanny L., 4,591,808, Cl. 331-116.0FE.
Lexer, Hans, to Steinmetz, Manfried. Infrared-radiating equipment with ceramic radiators. 4,591,697, Cl. 219-348.000.
Leybold-Heraeus GmbH: *See—*
Reuter, Wolfgang; and Hartmann, Manfred, 4,590,983, Cl. 164-258.000.
Leykamm, Herbert; and Knabel, Siegfried, to Kabel- und Metallwerke G. AG. Making of a bevel gear. 4,590,782, Cl. 72-354.000.
Lhomme S.A.: *See—*
Languillat, Jean-Paul, 4,591,405, Cl. 156-446.000.
Li, Lehmann K.: *See—*
Campbell, Jay E.; Reichmann, Richard H.; and Li, Lehmann K., 4,591,086, Cl. 227-19.000.
Licentia Patent-Verwaltungs-GmbH: *See—*
Schroder, Ernst, 4,591,733, Cl. 307-246.000.
Lichtenstein, Lispa R.: *See—*
Spani, Toni; and Lichtenstein, Rita, 4,590,919, Cl. 126-382.000.
Lichtenstein, Rita: *See—*
Spani, Toni; and Lichtenstein, Rita, 4,590,919, Cl. 126-382.000.
Lickus, Leonard J.: *See—*
Brown, Richard L.; Anderson, Daniel J.; and Lickus, Leonard J., 4,590,650, Cl. 29-33.00M.
Liebel, Henry L., to Signode Paper Products Company. Cargo air bag. 4,591,519, Cl. 428-35.000.
Liebl, Thomas J. Leak detector for pneumatic tire valve core. 4,590,794, Cl. 73-48.000.
Liedtke, Gerald R.: *See—*
Liedtke, Robert W.; and Liedtke, Gerald R., 4,590,839, Cl. 84-422.00S.
Liedtke, Robert W.; and Liedtke, Gerald R. Pellet drum stick brush. 4,590,839, Cl. 84-422.00S.
Ligensa, Karl H.: *See—*
Nithammer, Egon; Ligensa, Karl H.; and Kresky, Fred C., 4,591,207, Cl. 297-366.000.
Lightfoot, Benjamin H.; and Atkins, Harold W. Method and apparatus for determining tension and pressure. 4,590,808, Cl. 73-862.480.
Lim, Sam K.; Fong, Daniel D.; and Stoner, Eugene A., to Mechatron Systems, Inc. Daisywheel printer with improved mounting for mechanical elements. 4,591,284, Cl. 400-691.000.
Lin, Wei-Chung: *See—*
Smith, Karl E.; and Lin, Wei-Chung, 4,591,130, Cl. 254-134.3PA.
Lincoln Manufacturing Company, Inc.: *See—*
Henke, Mitchell C., 4,591,333, Cl. 432-10.000.
Linde Aktiengesellschaft: *See—*
Burr, Peter S., 4,591,365, Cl. 55-16.000.
Linhof Prazisions-Kamera-Werke GmbH: *See—*
Huhle, Horst, 4,591,252, Cl. 354-191.000.
Link, Edwin A.: *See—*
Yamat, Miguel B.; and Link, Edwin A., 4,591,679, Cl. 200-144.00B.
Linn, Leighton L.; and Mathiesen, Robert J., to J. B. Lima, Inc. Method for treatment and prevention of mastitis. 4,591,499, Cl. 424-93.000.
Lintott, Edward R.; and Harris, Kenneth M., to Lucas Industries Public Limited Company. Liquid fuel injection pumping apparatus. 4,590,910, Cl. 123-458.000.
Lipp, Herbert, to Rheinmetall GmbH. Velocity-simulator for controlling the reciprocal movements of parts of a large caliber gun barrel. 4,591,342, Cl. 434-18.000.
Lippok, Peter: *See—*
Hodes, Erich; Lippok, Peter; and Miotk, Bernd, 4,591,536, Cl. 428-643.000.
Lisle Corporation: *See—*
Miller, Merrill R., 4,591,817, Cl. 335-285.000.
Litovitz, Theodore A.: *See—*
Macedo, Pedro B.; Sutter, Herbert G.; Mohr, Robert K.; and Simmons, Catherine J., 4,591,455, Cl. 252-629.000.
Liu, Chao-Min; and Westley, John, to Hoffmann-La Roche Inc. Antibiotic X-14934A and a method for its preparation. 4,591,559, Cl. 435-76.000.
Livermore, Richard S.: *See—*
Davidson, Arthur R.; and Livermore, Richard S., 4,590,829, Cl. 83-22.000.
Livings, Rodney; and Singh, Harjit, to Nautech Limited. Compass systems. 4,590,679, Cl. 33-361.000.
Livnat, Aminadav: *See—*
Kafri, Oded; Livnat, Aminadav; and Keren, Eliezer, 4,590,681, Cl. 33-378.000.
Lloyd, Darrell W.: *See—*
Vickers, Timothy J.; and Lloyd, Darrell W., 4,591,289, Cl. 403-322.000.
Lloyd, Kenneth O.: *See—*
Mattes, M. Jules; Thomson, Timothy M.; Old, Lloyd J.; and Lloyd, Kenneth O., 4,591,572, Cl. 436-538.000.
Loeb, Gerald E., to Biomed Concepts, Inc. Surgically implantable electrode for nerve bundles. 4,590,946, Cl. 128-642.000.
Loeser, Norbert: *See—*
Schneider, Karl-Heinz; Paeschke, Otto; Del Fabro, Michael; and Loeser, Norbert, 4,591,276, Cl. 384-206.000.
Loffelholz, Frido: *See—*
Worschech, Kurt; Wedl, Peter; and Loffelholz, Frido, 4,591,452, Cl. 252-400.00A.
Lofquist, Robert A.; Weedon, Gene C.; and Cole, Charles J., to Allied Corporation. Method of spinning a nylon yarn having improved retention of a soil repellent finish on the nylon yarn. 4,591,473, Cl. 264-129.000.
Logan, David J., to Gerber Scientific Products, Inc. Method and apparatus for automatically spacing characters during composition. 4,591,999, Cl. 364-523.000.
Logothetis, Eleftherios M.: *See—*
Kaiser, William J.; and Logothetis, Eleftherios M., 4,591,417, Cl. 204-192.00R.
Lohmann, Robert P.; and Jeroszko, Ronald A., to United Technologies Corporation. High-performance burner construction. 4,590,769, Cl. 60-752.000.
Lohr, Joseph B.: *See—*
Moran, Michael J.; and Lohr, Joseph B., 4,591,012, Cl. 177-145.000.
Lok, Cornelis M.; and Ganguli, Keshab L., to Internationale Octrooi Maatschappij "Octropa" B.V. Process for preparing a transition metal-silicate catalyst. 4,591,579, Cl. 502-244.000.
Loley, Franz: *See—*
Behringer, Jurgen; Pluciniczak, Hans-Friedrich; Syllwasschy, Wolfgang; and Loley, Franz, 4,591,529, Cl. 428-252.000.
Lomen, John J. Turning signal and brake light control apparatus and method. 4,591,824, Cl. 340-74.000.
Long, Stuart G.; and Maciocia, Michael J., to General Dynamics Pomona Division. Skin packaging procedure using laminated anti-static material. 4,590,741, Cl. 53-427.000.
L'Oreal: *See—*
Grollier, Jean F., 4,591,610, Cl. 524-55.000.
Losinger, Raymond E.: *See—*
Buonomo, Joseph P.; Houghtalen, Steven R.; Losinger, Raymond E.; and Valashinas, James W., 4,591,982, Cl. 364-200.000.
Lottes, Rosanna M.: *See—*
Foster, Robert W.; Lottes, Rosanna M.; and Swinehart, Grant E., 4,591,665, Cl. 179-18.0FH.
Louw, Jan T. Hair cutting apparatus. 4,590,675, Cl. 30-133.000.
Loveless, John G.: *See—*
Berg, Jeremy R.; Loveless, John G.; and Senkow, Walter, 4,590,721, Cl. 52-169.100.
Lovendahl, Norman H. Countersink with disposable insert. 4,591,302, Cl. 408-188.000.
Lovgren, Jeffrey L.: *See—*
Gaebelein, Georg, deceased; Bhend, Richard B.; Keillor, Robert D.; Lovgren, Jeffrey L.; and Mercer, John R., 4,591,727, Cl. 250-578.000.
Lowman, Michael E. Billiard ball and rack storage case. 4,591,051, Cl. 206-315.900.
Lozen, Franklin R. Ski lift and lubricant trap assembly. 4,590,863, Cl. 104-133.000.
LTV Aerospace and Defense Company: *See—*
Evans, Charles B.; and Murray, William J., 4,591,402, Cl. 156-350.000.
Lubrizol Corporation, The: *See—*
Quinn, Robert E., 4,591,612, Cl. 524-425.000.
Lucas, Charles H.; and Lewyn, Lanny L., to Hughes Aircraft Company. High efficiency oscillator output stage and method of operation. 4,591,808, Cl. 331-116.0FE.

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Gaskell, David J.; and Stevens, John W., 4,591,100, Cl. 239-533.300.

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Lintott, Edward R.; and Harris, Kenneth M., 4,590,910, Cl. 123-458.000.

Lucas International s.r.l.: *See*—
Italici, Rino, 4,592,091, Cl. 383-15.000.

Lueth, Roy C., to Ultra-Temp Corporation. Metallurgical process. 4,591,481, Cl. 419-26.000.

Lui, Umberto, to T.V.S. S.p.A. Soft ceramic kitchenware internally coated with a non-stick resin. 4,591,530, Cl. 428-325.000.

Lunazzi, Alessandro, to CIMA S.p.A. Hobbing machine tool changer having vertically and horizontally movable jaws. 4,590,661, Cl. 29-568.000.

Lund, Clarence A.; and Sugino, Michael D., to Motorola Inc. Radiation hard MOS devices and methods for the manufacture thereof. 4,591,890, Cl. 357-23.110.

Lundstrom, Jan-Erik, to ASEA Aktiebolag. Auxiliary memory in a video display unit of the raster scan type. 4,591,850, Cl. 340-799.000.

Luner, Vaclav: *See*—
Sedlak, Vaclav; Jurny, Josef; and Luner, Vaclav, 4,590,858, Cl. 101-352.000.

Lusk, Leonard A. Toilet ventilating device. 4,590,629, Cl. 4-213.000.

Lutton, David B.; and Melnick, Joel N., to Simmonds Precision Products, Inc. Monopole digital vernier torque meter. 4,590,806, Cl. 73-862.340.

Lutz, Dieter; and Thieler, Wolfgang, to SACHS-Systemtechnik GmbH. Clutch release group for a rotary clutch assembly. 4,591,039, Cl. 192-91.00A.

Lyman, John B.: *See*—
Stewart, Bruce E., Sr.; and Lyman, John B., 4,591,369, Cl. 55-374.000.

Lyne, Edward G. C.: *See*—
Cameron, Gordon M.; and Lyne, Edward G. C., 4,591,494, Cl. 423-522.000.

Lynk, Charles N., Jr.: *See*—
Noble, Scott W.; Burke, Timothy M.; and Lynk, Charles N., Jr., 4,591,851, Cl. 340-825.070.

M.A.N.-Roland Druckmaschinen Aktiengesellschaft: *See*—
Mamberer, Hans; Zeller, Reinhard; and Spang, Otto, 4,590,856, Cl. 101-350.000.

M. E. Cunningham Company: *See*—
Speicher, Edwin W., 4,591,279, Cl. 400-121.000.

Mabey, Dennis G., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Aircraft controls. 4,591,113, Cl. 244-76.00C.

Maccioni, Roberto: *See*—
Flosi, Corrado; and Maccioni, Roberto, 4,590,621, Cl. 2-2.000.

MacDuff, James L. Built-in vacuum system. 4,591,368, Cl. 55-372.000.

Macedo, Pedro B.; Sutter, Herbert G.; Mohr, Robert K.; and Simmons, Catherine J., to Macedo, Pedro B.; and Litovitz, Theodore A. Purification of contaminated liquid. 4,591,455, Cl. 252-629.000.

Maciocia, Michael J.: *See*—
Long, Stuart G.; and Maciocia, Michael J., 4,590,741, Cl. 53-427.000.

Mackenzie, Raymond W.; and Heinrich, Theodore M., to Westinghouse Electric Corp. Pulse width modulator for electronic watthour metering. 4,591,810, Cl. 332-9.00R.

Maeda, Kenichi: *See*—
Sugiyama, Yasuo; So, Masaomi; Hamaguchi, Ichiro; and Maeda, Kenichi, 4,590,712, Cl. 51-161.000.

Maeda, Narimichi: *See*—
Hagiwara, Yoshimune; Sugiyama, Shizuo; Maeda, Narimichi; Yumoto, Osamu; Akazawa, Takashi; Kobayashi, Masahito; Kita, Yasuhiro; and Kita, Yuzo, 4,592,006, Cl. 364-748.000.

Maeda, Toyoo: *See*—
Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi; Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, 4,591,558, Cl. 435-68.000.

Maekawa, Toshikazu: *See*—
Soneda, Mitsuo; Maekawa, Toshikazu; and Ohtsu, Takaji, 4,591,916, Cl. 358-213.000.

Magera, Matthias R. Refractory insulating shields for water-cooled pipes. 4,591,340, Cl. 432-234.000.

Magin, Berthold, to MTM Obermaier GmbH & Co. KG. Method of and apparatus for drying wound fiber or yarn. 4,590,683, Cl. 34-1.000.

Magnetic Controls Co.: *See*—
Vachhani, Vasantrai A., 4,591,223, Cl. 339-97.00R.

Magnin, Joel: *See*—
Fedeli, Jean M.; Jouve, Hubert; Magnin, Joel; and Pisella, Christian, 4,592,017, Cl. 365-19.000.

Majchrzak, Roland, to Gebr. Happich GmbH. Sun visor for automotive vehicles. 4,591,956, Cl. 362-144.000.

Major, Jeffrey T.; and Hall, Robert D., to Allied Corporation. Compact ring shaped brush motor. 4,591,750, Cl. 310-237.000.

Makabe, Hachiro; Tanaka, Haruhiko; and Kongoh, Takashi, to Janome Sewing Machine Co., Ltd. Electronic sewing machine having means for indicating a series of pattern numbers in normal and reverse order. 4,590,880, Cl. 112-445.000.

Makino Milling Machine Co., Ltd.: *See*—
Norota, Kenji, 4,590,662, Cl. 29-568.000.

Malis, Jerry L.; Malis, Leonard I.; Acorcey, Robert R.; and Solt, David, to Malis, Jerry L.; and Malis, Leonard I. Bipolar cutter/coagulator. 4,590,934, Cl. 128-303.140.

Malis, Leonard I.: *See*—
Malis, Jerry L.; Malis, Leonard I.; Acorcey, Robert R.; and Solt, David, 4,590,934, Cl. 128-303.140.

Malyshkin, Alexandr A.: *See*—
Pryadkin, Pavel P.; Pertsev, Leonid P.; Ziborov, Viktor S.; Pichakhchi, Alexandr F.; Malyshkin, Alexandr A.; and Onufriev, Vladislav N., 4,591,435, Cl. 210-230.000.

Mamberer, Hans; Zeller, Reinhard; and Spang, Otto, to M.A.N.-Roland Druckmaschinen Aktiengesellschaft. Lifter-type inker for rotary printing machine including rotational shock dampening means. 4,590,856, Cl. 101-350.000.

Manchester R & D Partnership: *See*—
Fergason, James L., 4,591,233, Cl. 350-334.000.

Manfredini, Alfonso, to Sasib S.p.A. Automatic control device for adjusting the suction exerted by suction flutes in cigarette transfer drums. 4,590,952, Cl. 131-94.000.

Maniscalco, Nunzio T. Clam opener. 4,590,644, Cl. 17-76.000.

Mann, Brian M.; and Florio, Joseph J. Cardiac tissue stimulator for stimulating in the DDX modality. 4,590,944, Cl. 128-419.0PG.

Mannesmann Rexroth GmbH: *See*—
Wolfges, Hans, 4,590,968, Cl. 137-625.640.

Mannesmann Tally Corporation: *See*—
Bringhurst, Edward D., 4,591,280, Cl. 400-124.000.

Mantellina, Calogero; Trivella, Roberto; and Quadraruopolo, Andrea, to Honeywell Information Systems Italia. Memory mapping method in a data processing system. 4,592,011, Cl. 364-900.000.

Manville Service Corporation: *See*—
Walker, Stanley F., 4,590,714, Cl. 52-3.000.

Mapro Inc.: *See*—
Kopernicky, Jaroslav J., 4,591,467, Cl. 264-37.000.

Marafini, Fabrizio: *See*—
Repetto, Eugenio; Marafini, Fabrizio; and Tesini, Francesco, 4,592,066, Cl. 373-72.000.

Marcel, Frederic E.; and Maume, Francois J. M., to Charbonnages de France. Drill soundproofing device. 4,591,009, Cl. 175-320.000.

March, David, to Thomson Leeds Company Inc. Caladryl display. 4,591,047, Cl. 206-45.180.

Marchetti, Augusto. Automatic taping unit with improved cutting system for carton sealing machines. 4,590,736, Cl. 53-137.000.

Marconi, Walter; Bartoli, Francesco; Morisi, Franco; and Pittalis, Francesco, to E.N.I. Ente Nazionale Idrocarburi. Treating pain, inflammation and/or platelet aggregation. 4,591,596, Cl. 514-375.000.

Marek, Henry S.: *See*—
Michel, Christian G.; Marek, Henry S.; and Baumann, John A., 4,591,408, Cl. 156-605.000.

Marier, Gregory J., to Yamaha Hatsudoki Kabushiki Kaisha. Suspension and steering mechanism for a snowmobile. 4,591,173, Cl. 280-21.00R.

Marino, Frank, to Wooster Brush Company, The. General purpose paint brush. 4,590,637, Cl. 15-160.000.

Markunas, Albert L., to Sundstrand Corporation. Dual pump controls. 4,591,317, Cl. 417-288.000.

Markus, Isidoro N.: *See*—
Reuter, Robert E.; and Markus, Isidoro N., 4,591,214, Cl. 312-110.000.

Marmol, Alfredo B.: *See*—
Van Exel, Gary A.; Perez, Victor; and Marmol, Alfredo B., 4,591,192, Cl. 285-83.000.

Marmon Company: *See*—
Connelly, John R., 4,590,627, Cl. 2-163.000.

Marshall, Garth D.: *See*—
Bloom, Phillip J.; and Marshall, Garth D., 4,591,928, Cl. 360-13.000.

Marshall, Kenneth H.: *See*—
Atkinson, Alan W.; Dearden, Katryna J.; Doyle, Christina; Lancaster, Janet M.; Marshall, Kenneth H.; and Robinson, Kay L., 4,591,166, Cl. 277-1.000.

Martinez, Donald G. Hydraulic fluid leak warning apparatus. 4,591,837, Cl. 340-605.000.

Maruchi Koken Kabushiki Kaisha: *See*—
Sakai, Utaro, 4,591,441, Cl. 210-649.000.

Maruno, Tooru; Nakamura, Kouzaburou; and Sasaki, Shigekuni, to Nippon Telegraph & Telephone Public Corporation. Optical adhesive composition. 4,591,627, Cl. 528-103.000.

Maryanoff, Bruce E.; and Nortey, Samuel O., to McNeilab, Inc. Anticonvulsant dioxolane methane sulfamates. 4,591,601, Cl. 514-462.000.

Masak, Raymond J., to United States of America, Air Force. Hand off integrator apparatus for signal detection. 4,591,856, Cl. 343-17.10R.

Masaki, Yoshifumi, to Sharp Kabushiki Kaisha. Read control circuit in a read only memory system. 4,592,027, Cl. 365-203.000.

Masaki, Yuichi; and Hotta, Yoshio, to Canon Kabushiki Kaisha. Liquid crystal display element having colored resin masking layer. 4,591,240, Cl. 350-339.00R.

Maschinenfabrik Herbert Meyer KG: *See*—
Engelbart, Wilhelm, 4,591,139, Cl. 271-9.000.

Masheff, Michael S., to E-Systems, Inc. MSK surface acoustic wave convolver. 4,592,009, Cl. 364-821.000.

Mashiko, Kazuyuki: *See*—
Sasaki, Akira; Mashiko, Kazuyuki; Saitoh, Shouji; and Hakoyama, Akiyoshi, 4,591,878, Cl. 346-76.0PH.

Mason Corporation: *See*—
McKibbin, John R., 4,590,719, Cl. 52-116.000.

Mason, Paul B.; and Morse, John B., to Polaroid Corporation. Apparatus for moving coated section of sheet material into and out of engagement with film frame. 4,591,255, Cl. 354-303.000.

Massachusetts Institute of Technology: *See—*
Cohen, Jonathan M.; Siegel, Ronald; and Langer, Robert, 4,591,496, Cl. 424-15.000.

Massey-Ferguson Inc.: *See—*
Bennett, John S., 4,590,817, Cl. 74-473.00R.

Massey, John: *See—*
Follows, Gordon W.; Hart, Christopher G.; and Massey, John, 4,591,468, Cl. 264-40.100.

Massot, Jean-Claude, to Electricite de France Service National. Drying plant for liquid or pasty products. 4,590,686, Cl. 34-86.000.

Masters, Larry C. Tamper-proof equipment securing housing. 4,591,657, Cl. 174-50.000.

Mastner, Georg, to BBC Brown, Boveri & Co., Ltd. Capacitive voltage transformer. 4,591,783, Cl. 324-126.000.

Masubuchi, Sadao, to Citizen Watch Co., Ltd. Matrix type color television panel driver circuit. 4,591,902, Cl. 358-59.000.

Masuda, Eiji: *See—*
Yamaguchi, Akira; and Masuda, Eiji, 4,591,801, Cl. 330-261.000.

Masuda, Hiroo: *See—*
Shimohigashi, Katsuhiro; Masuda, Hiroo; Ikuzaki, Kunihiko; and Kawamoto, Hiroshi, 4,592,022, Cl. 365-189.000.

Masuda, Toshio: *See—*
Higashimura, Toshinobu; and Masuda, Toshio, 4,591,440, Cl. 210-640.000.

Masuyama, Masayuki: *See—*
Kamiya, Minoru; Masuyama, Masayuki; Kitao, Ikuo; Wada, Shinji; and Horiguchi, Kiwami, 4,591,247, Cl. 351-211.000.

Mathews, Robert B., to Carb-A-Drink International, Inc. Beverage dispenser. 4,590,974, Cl. 141-1.000.

Mathias, Lon J., to University of Southern Mississippi. Monomer and polymers containing 4-aminopyridine. 4,591,625, Cl. 526-265.000.

Mathiesen, Robert J.: *See—*
Linn, Leighton L.; and Mathiesen, Robert J., 4,591,499, Cl. 424-93.000.

Matschinsky, Wolfgang, to Bayerische Motoren Werke AG. Wheel suspension for steerable front wheels of motor vehicles. 4,591,184, Cl. 280-666.000.

Matsubara, Toru; Iimura, Ikuro; Sakuma, Kuniharu; and Goto, Sumio, to Tokyo Juki Industrial Co., Ltd. Thread feed device in a sewing machine. 4,590,879, Cl. 112-278.000.

Matsuda, Takeshi; Miyamoto, Masasi; and Takei, Toshihiro, to Nippondenso Co., Ltd. Fuel pump for an automotive vehicle having a vapor discharge port. 4,591,311, Cl. 415-53.00T.

Matsufuji, Teruo: *See—*
Kawata, Yoshihiro; Sakata, Tsunetaka; Matsufuji, Teruo; Inomata, Tetsuro; and Miyashita, Hiroyuki, 4,592,046, Cl. 370-58.000.

Matsui, Koichi: *See—*
Tanikawa, Kouji; Matsui, Koichi; Taniguchi, Akira; Amano, Atsushi; Kanno, Masahide; and Takahashi, Yutaka, 4,590,924, Cl. 128-6.000.

Matsui, Takashi: *See—*
Miyafuji, Motohisa; Matsui, Takashi; and Harada, Hidekazu, 4,591,484, Cl. 420-481.000.

Matsui, Toshikazu: *See—*
Senzaki, Shigeo; Ikeuchi, Jun-ichiro; Matsui, Toshikazu; and Sawazaki, Norikazu, 4,592,041, Cl. 369-126.000.

Matsukawa, Naohiro; Isobe, Mitsuo; and Sakurai, Takayasu, to Shaibaura Denki Kabushiki Kaisha. Memory device resistant to soft errors. 4,592,026, Cl. 365-203.000.

Matsuki, Ikuo; Kamiya, Naoyuki; Ikeda, Toshimitsu; Takagi, Yoshiari; Iizuka, Yoshio; Yamaguchi, Yoshinobu; Funai, Hiroshi; Terasawa, Mutsumi; and Tasaka, Susumu, to Honda Giken Kogyo Kabushiki Kaisha. Process for decompression control in internal combustion engine and apparatus therefor. 4,590,905, Cl. 123-321.000.

Matsumoto, Hajime: *See—*
Kitaoka, Teruhiko; and Matsumoto, Hajime, 4,591,238, Cl. 353-122.000.

Matsumoto, Hidetoshi: *See—*
Kobayashi, Toshiyuki; Ohta, Takao; Miura, Masatsugu; and Matsumoto, Hidetoshi, 4,592,003, Cl. 364-579.000.

Matsumoto, Hiroshi: *See—*
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Yanagida, Koji; Kitagawa, Kazuo; Ochiai, Atsuhiro; Harada, Minoru; and Matsumoto, Hiroshi, 4,591,454, Cl. 252-626.000.

Matsumoto, Koichi: *See—*
Aono, Yasuhiro; and Matsumoto, Koichi, 4,591,244, Cl. 350-427.000.

Matsumoto, Masayuki: *See—*
Urabe, Hitoshi; Matsumoto, Masayuki; Kudo, Hisashi; and Shimazaki, Osamu, 4,591,904, Cl. 358-75.000.

Matsumura, Sadao: *See—*
Washizuka, Syoichi; and Matsumura, Sadao, 4,591,994, Cl. 364-500.000.

Matsumura, Susumu, to Canon Kabushiki Kaisha. Beam splitter and light measuring device for camera. 4,591,256, Cl. 354-402.000.

Matsuno, Kenji; and Kuse, Kazuma, to Toyo Seikan Kaisha Limited. Feeder for revolving electrode. 4,591,686, Cl. 219-81.000.

Matsuno, Kiyotaka: *See—*
Tsukamoto, Keisuke; Nagase, Masaomi; and Matsuno, Kiyotaka, 4,590,907, Cl. 123-357.000.

Matsuo, Takashi, to Calbee Foods Co., Ltd. Cutter for food materials. 4,590,835, Cl. 83-698.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Hirao, Yoshiaki; and Nagaoka, Yoshitomi, 4,591,736, Cl. 307-267.000.
Iwamoto, Shigeyoshi; Saeki, Yoshifumi; Kuribayashi, Takashi; Ishitsuka, Shinichiro; and Ogino, Nobukuni, 4,591,951, Cl. 361-417.000.
Kikuya, Satoshi; Minamide, Seiko; and Shibaike, Narito, 4,591,936, Cl. 360-132.000.
Ohnishi, Hiroshi; and Yamashita, Sadahiko, 4,592,095, Cl. 455-327.000.
Shimada, Yasuomi, 4,592,088, Cl. 381-90.000.
Uemura, Kichinosuke; and Yamaguchi, Yukio, 4,590,849, Cl. 99-331.000.
Wada, Chuzoh, 4,591,332, Cl. 431-62.000.

Matsushita Electronics Corporation: *See—*
Kimura, Masamichi, 4,591,760, Cl. 315-16.000.

Matsuura, Toshimi, to Omron Tateisi Electronics Co. Programmable controller. 4,592,053, Cl. 371-29.000.

Matsuzaka, Syoji; Kajiwara, Makoto; Miyoshi, Masanobu; and Yamashita, Kiyoshi, to Konishiroku Photo Industry Co., Ltd. Process for preparing silver halide emulsions. 4,591,549, Cl. 430-569.000.

Mattes, Donald A.; Landry, Steven G.; and Kendall, James M., to Andover Controls Corporation. Distributed drum emulating programmable controller system. 4,591,967, Cl. 364-132.000.

Mattes, M. Jules; Thomson, Timothy M.; Old, Lloyd J.; and Lloyd, Kenneth O., to Sloan-Kettering Institute for Cancer Research. Pigmentation associated, differentiation antigen of human melanoma and autologous antibody. 4,591,572, Cl. 436-538.000.

Matthews, Charles C., to General Motors Corporation. Brake system in a vehicle hybrid drive arrangement. 4,591,016, Cl. 180-165.000.

Maucere, Casper C.: *See—*
Wieland, Rolf H.; Brodbeck, Howard D.; Paston, Alan J.; and Maucere, Casper C., 4,590,656, Cl. 29-450.000.

Maume, Francois J. M.: *See—*
Marcel, Frederic E.; and Maume, Francois J. M., 4,591,009, Cl. 175-320.000.

Mayer, David, to Orange Julius International, Inc. Apparatus for processing frozen comestibles. 4,590,851, Cl. 99-455.000.

Mayer, David; and Hall, James F., Jr., to Orange Julius International Inc. Cooling system for apparatus for processing frozen comestibles. 4,590,852, Cl. 99-455.000.

Mazda Motor Corporation: *See—*
Morishita, Tsuyoshi; Osaki, Sigemi; Sakai, Noriyuki; and Kawado, Yasuhumi, 4,591,480, Cl. 419-9.000.
Yada, Yoshikuni; and Okazaki, Syunki, 4,590,895, Cl. 123-52.0MB.

Mazuda, Hiroo; Tamehiro, Hiroshi; Ohashi, Mamoru; Onoe, Yasumitsu; and Tamukai, Shinogu, to Nippon Steel Corporation. Method of producing steel having high strength and toughness. 4,591,396, Cl. 148-12.00F.

McAuslan, David N. Dental X-ray holder for use in endodontics. 4,592,084, Cl. 378-170.000.

McBride, Paul B., Jr.: *See—*
Wanasz, Michael J.; Harrison, Stanley N.; and McBride, Paul B., Jr., 4,591,763, Cl. 315-304.000.

McCann, James D.; Piatt, Michael J.; and Williams, Theodore F., to Eastman Kodak Company. Ink jet printing apparatus with orifice array cleaning system. 4,591,873, Cl. 346-75.000.

McCann, James D., to Eastman Kodak Company. Ink cartridge and cooperative continuous ink jet printing apparatus. 4,591,875, Cl. 346-75.000.

McCarty, George W.; and Smith, Somers H., III, to Solid State Chargers Research & Development. Multi-station modular charging system for cordless tools and appliances. 4,591,777, Cl. 320-2.000.

McClune, Glen E., to Cooper Industries, Inc. Grounding shielded cable connector assembly. 4,591,216, Cl. 339-14.00R.

McConnell, Harden M.: *See—*
Hafeman, Dean; Parce, John W.; and McConnell, Harden M., 4,591,550, Cl. 435-4.000.

McCorkle, Gary A., to United Technologies Corporation. Signal conditioning circuit for L/R VDT sensors. 4,591,795, Cl. 328-5.000.

McDonald, Quentin H.; Panicci, Richard L.; and Nowak, Ralph M., to Bobby-Mac Company, Inc. Safety shield for use in a vehicle. 4,591,208, Cl. 297-487.000.

McFarlane, Glenton P., to Johnson Matthey Public Limited Company. Pressure relief device. 4,590,957, Cl. 137-68.100.

McGarry, Charles N.; and Wehrenberg, Thomas M., to Corning Glass Works. Apparatus and method of filtering molten metal using honeycomb structure of sintered alumina as filter element. 4,591,383, Cl. 75-93.00R.

McGill, Robert W., to Figgie International Corporation. Pneumatic bottle stop. 4,590,744, Cl. 53-497.000.

McGillivray, Dean D. Adjustable quilting frame. 4,590,695, Cl. 38-102.200.

McGivern, James P.: *See—*
Sun, Shan C.; and McGivern, James P., 4,591,940, Cl. 361-68.000.

McIntyre, John D.: *See—*
Brown, Robert C.; and McIntyre, John D., 4,590,799, Cl. 73-432.00R.

McKean, John A., to Titan Tool Company. Combination stud driving tool and torque limiting device. 4,590,826, Cl. 81-53.200.

McKemie, George R.: *See—*
Broome, Mark W.; and McKemie, George R., 4,591,003, Cl. 172-597.000.

McKibbin, John R., to Mason Corporation. Erection hinge. 4,590,719, Cl. 52-116.000.

McNally, Guy W. W.: *See—*
Gaskell, Philip S.; Lagadec, Roger; and McNally, Guy W. W., 4,591,926, Cl. 360-13.000.

McNeilab, Inc.: *See—*
Maryanoff, Bruce E.; and Nortey, Samuel O., 4,591,601, Cl. 514-462.000.

McPhee, Charles J., to American Hospital Supply Corporation. Medical solution container and port construction therefor. 4,592,092, Cl. 383-80.000.

Mead Corporation, The: *See—*
Muller, Rolf, 4,591,043, Cl. 198-425.000.

Mechatron Systems, Inc.: *See—*
Lim, Sam K.; Fong, Daniel D.; and Stoner, Eugene A., 4,591,284, Cl. 400-691.000.

Meinert, Harry M., to Deere & Company. Pivoting shield assembly. 4,591,002, Cl. 172-510.000.

Meissner, David C.: *See—*
Summers, Frank V.; Meissner, David C.; and Brown, Ronald, 4,591,380, Cl. 75-35.000.

Melcher, Roy L.: *See—*
Ruger, William B.; and Melcher, Roy L., 4,590,697, Cl. 42-70.00F.

Melnick, Joel N.: *See—*
Lutton, David B.; and Melnick, Joel N., 4,590,806, Cl. 73-862.340.

Mencke, Helmut; Gruner, Hans-Jurgen; Oertmann, Peter; Nerlich, Horst; and Grabasch, Heinz, to VEB Kombinat Oberbekleidung Berlin Stammbetrieb VEB Herrenbekleidung Fortschritt. Edge guide and fabric feed for sewing machine. 4,590,876, Cl. 112-262.300.

Meneghini, Frank A.; and Palumbo, Paul S., to Polaroid Corporation. Photographic products and processes. 4,591,646, Cl. 548-146.000.

Menhennett, Herbert E.: *See—*
Howard, Robert; Helinski, Richard R.; Larsen, John R.; and Menhennett, Herbert E., 4,591,281, Cl. 400-126.000.

Mepla, Inc.: *See—*
Lautenschlager, Karl; Lautenschlager, Horst; and Lautenschlager, Gerhard W., 4,590,641, Cl. 16-238.000.

Mercer, John R.: *See—*
Gaebelein, Georg, deceased; Bhend, Richard B.; Keillor, Robert D.; Lovgren, Jeffrey L.; and Mercer, John R., 4,591,727, Cl. 250-578.000.

Merck & Co., Inc.: *See—*
Remy, David C., 4,591,587, Cl. 514-222.000.

Merhav, Shmuel J., to Sundstrand Data Control, Inc. Apparatus for measuring inertial specific force and angular rate of a moving body. 4,590,801, Cl. 73-510.000.

MERO-Raumstruktur GmbH & Co.: *See—*
Schmidek, Reinhard; and Stark, Manfred, 4,591,288, Cl. 403-260.000.

Metal Box plc: *See—*
Jenkins, Leonard A.; and Turner, Terence A., 4,591,360, Cl. 8-471.000.

Mettler Instrumente AG: *See—*
Baumann, Arthur, 4,591,011, Cl. 177-122.000.

Mettler, John: *See—*
Impey, John, 4,591,220, Cl. 339-17.00M.

Mettler, Rollin: *See—*
Impey, John, 4,591,220, Cl. 339-17.00M.

Meyer, Benjamin S. Mattress for accommodating bedpan or therapeutic device. 4,590,632, Cl. 5-462.000.

Meyer, Jean; and Gallardo, Manuel A. Whisk beater. 4,591,273, Cl. 366-288.000.

Meyers, Donald N.: *See—*
Piasecki, Frank N.; and Meyers, Donald N., 4,591,112, Cl. 244-26.000.

MG Industries: *See—*
Wieland, Rolf H.; Brodbeck, Howard D.; Paston, Alan J.; and Maucere, Casper C., 4,590,656, Cl. 29-450.000.

Michael Kohner Corp., The: *See—*
Kohner, Michael, 4,591,345, Cl. 446-361.000.

Michel, Christian G.; Marek, Henry S.; and Baumann, John A., to Stauffer Chemical Company. Liquid phase growth of crystalline polyphosphide. 4,591,408, Cl. 156-605.000.

Microencapsulation S.A.: *See—*
Scapinelli, Bruno, 4,591,500, Cl. 424-15.000.

Microwave Ovens Limited: *See—*
Eke, Kenneth I., 4,591,683, Cl. 219-10.55B.

Midrex International B.V. Rotterdam, Zurich Branch: *See—*
Summers, Frank V.; Meissner, David C.; and Brown, Ronald, 4,591,380, Cl. 75-35.000.

Miehle, August: *See—*
Kolitsch, Jorg; and Miehle, August, 4,591,784, Cl. 324-208.000.

Mifuji, Ken; and Shibata, Norio, to Nippon Soken, Inc.; and Toyota Jidosha Kabushiki Kaisha. Secondary air supply device for an internal combustion engine exhaust system. 4,590,762, Cl. 60-293.000.

Mihalic, William T.: *See—*
Buente, Stephen M.; and Mihalic, William T., 4,590,898, Cl. 123-90.550.

Mikata, Kenzo: *See—*
Tanabe, Masatoshi; and Mikata, Kenzo, 4,591,438, Cl. 210-282.000.

Mikulecky, Harvey W.; and Knapp, Todd K., to RTE Corporation. Low oil trip and/or lockout apparatus. 4,591,816, Cl. 335-6.000.

Miletic, Igor, to U.S. Philips Corporation. Hybrid junction having three conductive lines coaxially disposed. 4,591,813, Cl. 333-117.000.

Miller, Alan: *See—*
Muller-Girard, Otto; and Miller, Alan, 4,591,796, Cl. 328-184.000.

Miller, Charles B.: *See—*
Kovach, Stephen M.; and Miller, Charles B., 4,591,425, Cl. 208-74.000.

Miller, Gerald J.: *See—*
Soden, George B.; and Miller, Gerald J., 4,591,747, Cl. 310-71.000.

Miller, Gordon G.: *See—*
Fradenburgh, Evan A.; Kiely, Edmond F.; and Miller, Gordon G., 4,591,400, Cl. 156-80.000.

Miller, Merrill R., to Lisle Corporation. Magnetic socket holder. 4,591,817, Cl. 335-285.000.

Miller, Paul S.; and T'so, Paul O. P., to Johns Hopkins University, The. Preparation of oligodeoxyribonucleoside alkyl or arylphosphonates. 4,591,614, Cl. 525-54.110.

Milliken Research Corporation: *See—*
Wilkinson, Jack A., 4,590,973, Cl. 139-443.000.

Minami, Hisashi: *See—*
Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi; Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, 4,591,558, Cl. 435-68.000.

Minami, Toshiaki: *See—*
Satake, Toshimi; Minami, Toshiaki; and Fujimura, Fumio, 4,591,888, Cl. 346-209.000.

Minamide, Seiko: *See—*
Kikuya, Satoshi; Minamide, Seiko; and Shibaike, Narito, 4,591,936, Cl. 360-132.000.

Mincsovics, Emil: *See—*
Tyihak, Erno; Mincsovics, Emil; Knoll, Jozsef; Zoltan, Sandor; Lak, Istvan; Tetenyi, Peter; Kalasz, Huba; and Nagy, Janos, 4,591,524, Cl. 428-167.000.

Miner Enterprises, Inc.: *See—*
Hammarlund, Richard C., 4,591,059, Cl. 213-32.00R.

Minialoff, Edward P.: *See—*
Blendick, Leonard E., 4,590,730, Cl. 52-461.000.

Minnesota Mining and Manufacturing Company: *See—*
Delprato, Ivano, 4,591,548, Cl. 430-389.000.
Holmen, Reynold E.; and Downing, Edward J., 4,591,189, Cl. 283-83.000.
Samuelson, Bruce E., 4,591,407, Cl. 156-527.000.

Minolta Camera Kabushiki Kaisha: *See—*
Tokumaru, Hisashi; and Ogino, Shuji, 4,591,235, Cl. 350-427.000.
Ueda, Nobuo; and Fujita, Masafumi, 4,591,264, Cl. 355-68.000.

Miotk, Bernd: *See—*
Hodes, Erich; Lippok, Peter; and Miotk, Bernd, 4,591,536, Cl. 428-643.000.

Mira Lanza S.p.A.: *See—*
Nistri, Ugo; Baroffio, Romano; and Colombo, Paolo, 4,591,450, Cl. 252-135.000.

Misawa, Toshiyuki: *See—*
Morozumi, Shinji; Misawa, Toshiyuki; and Nakazawa, Yoshio, 4,591,848, Cl. 340-784.000.

Misiorny, Alfons: *See—*
Helgstrand, Ake J. E.; Johansson, Karl N.; Misiorny, Alfons; Noren, Jan O.; and Stening, Goran B., 4,591,583, Cl. 514-120.000.

Mr. Gasket Company: *See—*
Browning, James R.; and Carlo, Louis D., 4,591,211, Cl. 301-9.00G.

Mita Industrial Co., Ltd.: *See—*
Nakazawa, Toru, 4,591,541, Cl. 430-59.000.

Mitani, Sotozi: *See—*
Tanaka, Hiroshi; Mitani, Sotozi; and Sakurai, Yasushi, 4,590,783, Cl. 72-384.000.

Mitre Corporation, The: *See—*
Jacobson, Stephen R., 4,591,858, Cl. 343-17.700.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Honda, Takenobu, 4,591,025, Cl. 187-20.000.
Iwaki, Yoshiyuki, 4,591,278, Cl. 384-480.000.
Kaneno, Nobuaki; and Takahashi, Kazuhisa, 4,591,464, Cl. 261-153.000.
Kumabe, Hisao; Sogo, Toshio; and Takamiya, Saburo, 4,592,061, Cl. 372-45.000.
Nakajima, Hiroyuki; Miyamoto, Fumiyuki; Murayama, Masakazu; Oka, Seiji; and Jidai, Eiki, 4,591,623, Cl. 525-524.000.
Namekawa, Toshihiko; Kasahara, Masao; Tokiwa, Kinichiro; Inoue, Tohru; and Okamura, Shigeru, 4,592,054, Cl. 371-39.000.
Ono, Shoziro, 4,591,751, Cl. 310-269.000.
Tanaka, Hitoshi, 4,591,989, Cl. 364-474.000.
Tsuji, Shintaro, 4,591,985, Cl. 364-424.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Ishihara, Takao, 4,590,868, Cl. 110-347.000.

Mitsubishi Petrochemical Co., Ltd.: *See—*
Miyata, Seizo; Tasaka, Shigeru; Saito, Kazuo; Seo, Iwao; Nakajima, Kenji; and Kosaka, Takeshi, 4,591,465, Cl. 264-22.000.

Mitsuka, Ikuo, to Dainippon Screen Mfg. Co., Ltd. Method of correcting distortion of an image reproduced by an image reproducing system. 4,591,880, Cl. 346-108.000.

Miura, Kuniaki; Kobori, Yasunori; Fukushima, Isao; Shiomi, Makoto; and Kano, Kenji, to Hitachi, Ltd. FM signal demodulation circuit. 4,591,798, Cl. 329-102.000.

Miura, Kuniaki; Okada, Yoshinori; Fukushima, Isao; and Tamura, Teizo, to Hitachi, Ltd. Multiplex magnetic recording and reproduction system. 4,591,924, Cl. 358-330.000.

Miura, Kunio: *See—*
Gomi, Shimpei; Arai, Tomio; Mogi, Fumio; Nakagawa, Takao; Miura, Kunio; and Otani, Sugio, 4,591,424, Cl. 208-40.000.

Miura, Masatsugu: *See*—
Kobayashi, Toshiyuki; Ohta, Takao; Miura, Masatsugu; and Matsumoto, Hidetoshi, 4,592,003, Cl. 364-579.000.
Miyafuji, Motohisa; Matsui, Takashi; and Harada, Hidekazu, to Kabushiki Kaisha Kobe Seiko Sho. Lead materials for semiconductor devices. 4,591,484, Cl. 420-481.000.
Miyajima, Hiromu: *See*—
Kawai, Hiromasa; Morinaga, Takashi; Miyajima, Hiromu; Akima, Toshio; Kato, Mitsuharu; and Hosoi, Yutaka, 4,591,626, Cl. 526-282.000.
Miyamoto, Fumiyuki: *See*—
Nakajima, Hiroyuki; Miyamoto, Fumiyuki; Murayama, Masakazu; Oka, Seiji; and Jidai, Eiki, 4,591,623, Cl. 525-524.000.
Miyamoto, Koichi; Takahashi, Yuji; and Kikuchi, Yutaka, to Canon Kabushiki Kaisha. Multi-function image recording apparatus. 4,591,884, Cl. 346-153.100.
Miyamoto, Masasi: *See*—
Matsuda, Takeshi; Miyamoto, Masasi; and Takei, Toshihiro, 4,591,311, Cl. 415-53.00T.
Miyamoto, Tatsuo: *See*—
Sato, Yoshihiro; Sasaki, Kenichi; Miyamoto, Tatsuo; and Tsuzaka, Hideo, 4,591,303, Cl. 408-206.000.
Miyashita, Hiroyuki: *See*—
Kawata, Yoshihiro; Sakata, Tsunetaka; Matsufuji, Teruo; Inomata, Tetsuro; and Miyashita, Hiroyuki, 4,592,046, Cl. 370-58.000.
Miyasho, Yasuo, to Victor Company of Japan, Ltd. Information signal track search system in a rotary recording medium reproducing apparatus. 4,592,035, Cl. 369-32.000.
Miyata, Mitsuto: *See*—
Nozawa, Ryoichiro; Kawamura, Hideaki; and Miyata, Mitsuto, 4,591,968, Cl. 364-167.000.
Miyata, Seizo; Tasaka, Shigeru; Saito, Kazuo; Seo, Iwao; Nakajima, Kenji; and Kosaka, Takeshi, to Mitsubishi Petrochemical Co., Ltd.; and Miyata, Seizo. Method of producing polymeric electret element. 4,591,465, Cl. 264-22.000.
Miyata, Seizo; and Kobayashi, Satoru, to Central Glass Company, Limited. Optical plastics material using methacrylic resin and fluorocopolymer. 4,591,616, Cl. 525-185.000.
Miyatake, Henry J.; and Sakurai, Seiya, to Boeing Company, The. Propeller pitch control system and apparatus. 4,591,313, Cl. 416-155.000.
Miyauchi, Nobuyuki: *See*—
Hayakawa, Toshiro; Miyauchi, Nobuyuki; and Yano, Seiki, 4,592,060, Cl. 372-44.000.
Miyoshi, Masanobu: *See*—
Matsuzaka, Syoji; Kajiwara, Makoto; Miyoshi, Masanobu; and Yamashita, Kiyoshi, 4,591,549, Cl. 430-569.000.
Mizuguchi, Yoshihiko; and Watanabe, Fumio, to Kokusai Denshin Denwa Kabushiki Kaisha. Multi-beam antenna and its configuration process. 4,591,866, Cl. 343-781.00P.
Mizuhara, Howard, to GTE Products Corporation. Heat insulated reciprocating component of an internal combustion engine and method of making same. 4,590,901, Cl. 123-193.00P.
Mizuhara, Howard, to GTE Products Corporation. Method of brazing ceramics using active brazing alloys. 4,591,535, Cl. 428-627.000.
Mizuno Corporation: *See*—
Kawashima, Yukio; and Nishijima, Kounosuke, 4,590,693, Cl. 36-126.000.
Mizuno, Fumio: *See*—
Ando, Minato; Ito, Masaaki; and Mizuno, Fumio, 4,591,574, Cl. 501-136.000.
Mizuno, Ryukichi: *See*—
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Yanagida, Koji; Kitagawa, Kazuo; Ochiai, Atsuhiro; Harada, Minoru; and Matsumoto, Hiroshi, 4,591,454, Cl. 252-626.000.
Mizutani, Morikazu: *See*—
Nishino, Fumio; Onoda, Shigeyoshi; Nomura, Akihiro; Mizutani, Morikazu; Kanemitsu, Shinji; and Toriumi, Mototada, 4,591,258, Cl. 355-3.00R.
Mobil Oil Corporation: *See*—
Campbell, Gregory A.; and Seefried, Carl G., Jr., 4,591,607, Cl. 521-137.000.
Dennis, Charles L., 4,592,033, Cl. 367-76.000.
Hoehn, Gustave L., Jr., 4,591,785, Cl. 324-239.000.
Hoskin, Dennis H.; Rollmann, L. Deane; Shoemaker, Gerald L.; and Schmitt, Kirk D., 4,590,996, Cl. 166-244.100.
Stowe, Lawrence R., 4,590,997, Cl. 166-250.000.
Mochida, Ei: *See*—
Ohnishi, Haruo; Kosuzume, Hiroshi; Suzuki, Yasuo; and Mochida, Ei, 4,591,504, Cl. 424-94.000.
Mochida Pharmaceutical Co., Ltd.: *See*—
Ohnishi, Haruo; Kosuzume, Hiroshi; Suzuki, Yasuo; and Mochida, Ei, 4,591,504, Cl. 424-94.000.
Mocker, Hans W.: *See*—
Gregorich, David P.; and Mocker, Hans W., 4,591,761, Cl. 315-170.000.
Mocko, Dean E.: *See*—
Sciotti, Robert; and Mocko, Dean E., 4,590,911, Cl. 123-468.000.
Moco Thermal Industries: *See*—
Konczalski, Ronald L., 4,591,336, Cl. 432-59.000.
Moeller, Jerris C.; Stewart, Douglas V.; and Tabereaux, Alton T., to Reynolds Metals Company. Protective barrier for alumina reduction cells. 4,591,419, Cl. 204-243.00R.
Moen, Bruce A., to Adolph Coors Company. Plastic container with base cup formed from single blow molded plastic body. 4,591,066, Cl. 220-69.000.
Mogi, Fumio: *See*—
Gomi, Shimpei; Arai, Tomio; Mogi, Fumio; Nakagawa, Takao; Miura, Kunio; and Otani, Sugio, 4,591,424, Cl. 208-40.000.
Mohr, Friedemann, to International Standard Electric Corporation. Rotation rate measuring instrument. 4,591,269, Cl. 356-350.000.
Mohr, Gregory L., to Butler Manufacturing Company. Activation kits for pre-sets. 4,591,656, Cl. 174-48.000.
Mohr, Robert K.: *See*—
Macedo, Pedro B.; Sutter, Herbert G.; Mohr, Robert K.; and Simmons, Catherine J., 4,591,455, Cl. 252-629.000.
Mohri, Kaneo; and Kageyama, Toshinobu, to Aisin Seiki Kabushiki Kaisha. Magnetic field sensing device. 4,591,788, Cl. 324-260.000.
Molecular Devices Corporation: *See*—
Hafeman, Dean; Parce, John W.; and McConnell, Harden M., 4,591,550, Cl. 435-4.000.
Molex Incorporated: *See*—
Brown, Richard L.; Anderson, Daniel J.; and Lickus, Leonard J., 4,590,650, Cl. 29-33.00M.
Squitieri, Andrew, 4,591,225, Cl. 339-99.00R.
Monarch Marking Systems, Inc.: *See*—
Hamisch, Paul H., Jr., 4,591,404, Cl. 156-384.000.
Pou, Frederick M.; and Straub, Richard L., 4,590,859, Cl. 101-426.000.
Monforte, Mathew L., to Monforte Robotics, Inc. Robotic end effectors. 4,591,198, Cl. 294-88.000.
Monforte Robotics, Inc.: *See*—
Monforte, Mathew L., 4,591,198, Cl. 294-88.000.
Mongeon, Robert J.; and Henschke, Robert W., to United States of America, Army. Frequency stabilized laser. 4,592,058, Cl. 372-32.000.
Monno, Asao: *See*—
Funyu, Yutaka; Okumura, Tadashi; Monno, Asao; and Shimizu, Masami, 4,590,658, Cl. 29-464.000.
Monsan, Pierre: *See*—
Paul, Francois; Monsan, Pierre; and Auriol, Daniel, 4,591,563, Cl. 435-193.000.
Montedison S.p.A.: *See*—
Caporiccio, Gerardo; and Strepparola, Ezio, 4,591,444, Cl. 210-748.000.
Montenot, Jean: *See*—
Legros, Michel; and Montenot, Jean, 4,591,662, Cl. 179-2.0DP.
Mookherjee, Braja D.; Trenkle, Robert W.; Wolff, Robin K.; Boden, Richard M.; and Yoshida, Takao, to International Flavors & Fragrances, Inc. Methyl substituted pinyl oxopentenes and organoleptic uses thereof. 4,591,451, Cl. 252-522.00R.
Moore, Colin, to BOC Group, plc, The. Apparatus and method for burning fuel. 4,591,331, Cl. 431-16.000.
Moore, Eugene R. Freeze coagulation process. 4,591,632, Cl. 528-481.000.
Moore, John M.: *See*—
Smith, David B.; and Moore, John M., 4,591,147, Cl. 272-69.000.
Morales-Garza, Fernando; Morales-Garza, Oscar; and Ortiz-Salinas, Jorge E. Wireless transmission from the television set to the television station. 4,591,906, Cl. 358-84.000.
Morales-Garza, Oscar: *See*—
Morales-Garza, Fernando; Morales-Garza, Oscar; and Ortiz-Salinas, Jorge E., 4,591,906, Cl. 358-84.000.
Moran, Michael J.; and Lohr, Joseph B., to USM Corporation. Weighing apparatus with improved weighing bucket. 4,591,012, Cl. 177-145.000.
Mordau, Manfred: *See*—
Burk, Gerhard; and Mordau, Manfred, 4,591,202, Cl. 296-194.000.
Morf, Rudolf H.: *See*—
Heeb, Egon J.; Knop, Karl H.; and Morf, Rudolf H., 4,591,900, Cl. 358-44.000.
Mori, Issei, to Tokyo Shibaura Denki Kabushiki Kaisha. Radiation measuring device. 4,591,984, Cl. 364-414.000.
Mori, Noritaki: *See*—
Ogami, Nobutoshi; and Mori, Noritaki, 4,591,044, Cl. 198-346.300.
Mori, Toshihiro, to Nippon Electric Co., Ltd. Paging receiver with a decoder-P-ROM. 4,591,853, Cl. 340-825.440.
Mori, Yoshitada: *See*—
Yoshigi, Naohiro; Chikano, Takahide; and Mori, Yoshitada, 4,591,561, Cl. 435-101.000.
Morinaga Milk Industry Co., Ltd.: *See*—
Kuboyama, Morio; Harada, Yoshitsugu; Kawashiri, Akio; and Takahashi, Eiji, 4,591,571, Cl. 436-533.000.
Morinaga, Takashi: *See*—
Kawai, Hiromasa; Morinaga, Takashi; Miyajima, Hiromu; Akima, Toshio; Kato, Mitsuharu; and Hosoi, Yutaka, 4,591,626, Cl. 526-282.000.
Morino, Daizo: *See*—
Ueda, Ikuo; Morino, Daizo; and Takimoto, Koichi, 4,591,590, Cl. 514-252.000.
Morishita, Tsuyoshi; Osaki, Sigemi; Sakai, Noriyuki; and Kawado, Yasuhumi, to Mazda Motor Corporation. Method for sealing porous metals. 4,591,480, Cl. 419-9.000.
Morisi, Franco: *See*—
Marconi, Walter; Bartoli, Francesco; Morisi, Franco; and Pittalis, Francesco, 4,591,596, Cl. 514-375.000.
Morito, Hiroshi, to NEC Corporation. Output circuit capable of being connected to another circuit having transistors of any conduction type. 4,591,742, Cl. 307-475.000.
Morozumi, Shinji; Misawa, Toshiyuki; and Nakazawa, Yoshio, to Seiko Epson Corporation. Matrix panel with an active driving system. 4,591,848, Cl. 340-784.000.
Morris, Arthur. Fountain. 4,591,094, Cl. 239-17.000.

Morris, John P., to Andrew Corporation. Method and apparatus for flaring a tube. 4,590,785, Cl. 72-392.000.
Morris, Michael D.; and Chen, Tsuey I., to Board of Regents acting on behalf of University of Michigan. Photothermal deflection densitometer for thin layer chromatography. 4,591,272, Cl. 356-432.000.
Morse, John B.: *See*—
Mason, Paul B.; and Morse, John B., 4,591,255, Cl. 354-303.000.
Mortvedt, Eugene S.; and Boster, Eugene M., to Genes' Enterprise Corp. Quick attach fender and method for using same. 4,591,178, Cl. 280-154.000.
Moser, Helmut: *See*—
Greve, Manfred; and Moser, Helmut, 4,591,635, Cl. 534-612.000.
Mosher, Bruce A. Exercise device. 4,591,150, Cl. 272-137.000.
Mosig, Ernst, to Webasto-Werk W. Baier GmbH & Co. Water heater. 4,590,888, Cl. 122-149.000.
Mossbach, Wilhelm, to Philipp Kreiss GmbH & Co. Truma-Geratebau. Space heater for small rooms. 4,590,917, Cl. 126-90.00R.
Mossberg Industries: *See*—
Wirts, Harold L.; and Corner, Horace B., 4,591,110, Cl. 242-129.800.
Mosser, Jacqueline: *See*—
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; Mosser, Jacqueline; and Pontagnier, Henri, 4,591,600, Cl. 514-456.000.
Motorola, Inc.: *See*—
Davis, Walter L., 4,591,807, Cl. 331-116.00R.
Hanna, John E., 4,591,830, Cl. 340-347.0AD.
Lund, Clarence A.; and Sugino, Michael D., 4,591,890, Cl. 357-23.110.
Noble, Scott W.; Burke, Timothy M.; and Lynk, Charles N., Jr., 4,591,851, Cl. 340-825.070.
Opas, George F., 4,591,800, Cl. 330-86.000.
Patsiokas, Stelios J., 4,591,863, Cl. 343-702.000.
Paulson, Wayne M.; and Hughes, David W., 4,591,821, Cl. 338-308.000.
Mott, Richard C., to Honeywell Inc. Pulse width modulated pressure source. 4,590,970, Cl. 137-828.000.
Mruk, William J.: *See*—
Bialas, John S., Jr.; Daniels, Richard J.; and Mruk, William J., 4,591,738, Cl. 307-296.00R.
MTM Obermaier GmbH & Co. KG: *See*—
Magin, Berthold, 4,590,683, Cl. 34-1.000.
Muhlhaus, Ludwig: *See*—
Buxel, Ludwig M.; Muhlhaus, Ludwig; and Neumann, Ulrich, 4,591,335, Cl. 432-15.000.
Mukawa, Naoki: *See*—
Kuroda, Hideo; and Mukawa, Naoki, 4,591,909, Cl. 358-136.000.
Muller-Girard, Otto; and Miller, Alan, to Transmation, Inc. Performance predictable linearizing or function modifying circuit. 4,591,796, Cl. 328-184.000.
Muller, Hans, to DrM Dr. Muller AG. Method of filtering and a device for filtering solid-containing liquids. 4,591,446, Cl. 210-797.000.
Muller, Rainer: *See*—
Goebel, Konrad; Muller, Rainer; and Schiffers, Ulrich, 4,590,760, Cl. 60-39.120.
Muller, Rolf, to Mead Corporation, The. Mechanism for spacing and conveying articles in a packaging machine. 4,591,043, Cl. 198-425.000.
Mulliner, Richard R.; and Ajioka, James S., to Hughes Aircraft Company. Solder reflow process for soldering shaped articles together. 4,591,088, Cl. 228-121.000.
Mundell, Peter J.: *See*—
Hunt, Michael S.; Mundell, Peter J.; and Strover, Angus E., 4,590,928, Cl. 128-92.00D.
Murakami, Hideto: *See*—
Hagiwara, Yutaca; Kitamura, Terukiyo; and Murakami, Hideto, 4,591,028, Cl. 188-72.200.
Murakami, Shohachi: *See*—
Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi; Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, 4,591,558, Cl. 435-68.000.
Murase, Takao: *See*—
Kato, Nobuhide; and Murase, Takao, 4,591,422, Cl. 204-426.000.
Kato, Nobuhide; and Murase, Takao, 4,591,423, Cl. 204-428.000.
Murata Manufacturing Co., Ltd.: *See*—
Ito, Katsuo; Senga, Yasushi; and Murata, Yoshio, 4,591,814, Cl. 333-177.000.
Nakamura, Takeshi, 4,591,811, Cl. 332-31.00T.
Murata, Yoshio: *See*—
Ito, Katsuo; Senga, Yasushi; and Murata, Yoshio, 4,591,814, Cl. 333-177.000.
Murayama, Masakazu: *See*—
Nakajima, Hiroyuki; Miyamoto, Fumiyuki; Murayama, Masakazu; Oka, Seiji; and Jidai, Eiki, 4,591,623, Cl. 525-524.000.
Murphy, Jack J. Shackles. 4,590,882, Cl. 114-108.000.
Murray, Clarence L.; and Bright, John T., to Foundation Control Systems. Method for positioning and stabilizing a concrete slab. 4,591,466, Cl. 264-35.000.
Murray, William J.: *See*—
Evans, Charles B.; and Murray, William J., 4,591,402, Cl. 156-350.000.
Muta, Tomonobu: *See*—
Nakamura, Chiaki; Oe, Kouji; Muta, Tomonobu; and Sasaki, Toshiki, 4,591,545, Cl. 430-284.000.
MWC Lighting: *See*—
Jones, Bill F., 4,591,960, Cl. 362-298.000.
Myles, Sam A.; and Katz, Paul C., to Triplex Manufacturing Co. Shock-reducing lamp assembly for vehicles. 4,591,961, Cl. 362-390.000.
N. Foss ApS: *See*—
Spinell, Max; and Engstrom, Bertil, 4,591,445, Cl. 210-781.000.
Nagae, Yoshiharu: *See*—
Umeda, Takao; Ooishi, Kazuya; Igawa, Tatsuo; Hori, Yasuro; Nagae, Yoshiharu; and Isogai, Masato, 4,591,886, Cl. 346-160.000.
Nagai, Yasuo: *See*—
Yamada, Kazuji; Kobayashi, Ryoichi; Nagai, Yasuo; Shimizu, Isao; and Kawakami, Kanji, 4,591,780, Cl. 323-313.000.
Nagamine, Tsuyoshi: *See*—
Nozawa, Ryoichiro; Nagamine, Tsuyoshi; Kawamura, Hideaki; and Fujibayashi, Kentaro, 4,591,771, Cl. 318-569.000.
Nagano, Katsumi, to Tokyo Shibaura Denki Kabushiki Kaisha. Impedance conversion circuit. 4,591,739, Cl. 307-297.000.
Nagano, Masashi, to Shimano Industrial Company Limited. Caliper brake having position maintenance means. 4,591,026, Cl. 188-2.00D.
Naganuma, Takao: *See*—
Fuse, Yoshiro; Naganuma, Takao; Fujimori, Akiyoshi; Arai, Kozo; Igarashi, Katsutoshi; and Naito, Yuzi, 4,591,724, Cl. 250-492.100.
Nagaoka, Yoshitomi: *See*—
Hirao, Yoshiaki; and Nagaoka, Yoshitomi, 4,591,736, Cl. 307-267.000.
Nagase, Masaomi: *See*—
Tsukamoto, Keisuke; Nagase, Masaomi; and Matsuno, Kiyotaka, 4,590,907, Cl. 123-357.000.
Nagashima, Masasumi: *See*—
Nozaki, Mineo; Asakura, Osamu; Nagashima, Masasumi; and Uchikata, Yoshio, 4,591,876, Cl. 346-76.0PH.
Nagy, Janos: *See*—
Kovacs, Antal; Erdei, Janos; Kovats, Karoly; Polya, Laszlo ; Pasztor, Karoly; Nagy, Janos; Pepo , Pal; Pepo , Peter; Kiss, Gyorgy; and Kajati, Istvan, 4,591,379, Cl. 71-94.000.
Tyihak, Erno; Mincsovics, Emil; Knoll, Jozsef; Zoltan, Sandor; Lak, Istvan; Tetenyi, Peter; Kalasz, Huba; and Nagy, Janos, 4,591,524, Cl. 428-167.000.
Nahra, John E.; and Woods, Walter, to DASI Industries, Inc. Method and apparatus for treating liquid materials. 4,591,463, Cl. 261-116.000.
Naito, Kazuo; Fuse, Tadashi; Tanuma, Itsuo; Fukuura, Yukio; and Ishikawa, Hikaru, to Bridgestone Tire Co., Ltd. Anaerobic adhesive composition comprising modified unsaturated polymer and (meth)acrylic acid. 4,591,618, Cl. 525-279.000.
Naito, Sachio; and Nemoto, Toshiyuki, to Kao Corporation. Odor-removing and deodorizing composition employing a hydrolysate of keratin material. 4,591,497, Cl. 424-43.000.
Naito, Takayuki: *See*—
Hoshi, Hideaki; Okumura, Jun; Naito, Takayuki; Abe, Yoshio; and Aburaki, Shimpei, 4,591,641, Cl. 544-16.000.
Naito, Yuzi: *See*—
Fuse, Yoshiro; Naganuma, Takao; Fujimori, Akiyoshi; Arai, Kozo; Igarashi, Katsutoshi; and Naito, Yuzi, 4,591,724, Cl. 250-492.100.
Nakada, Hitoshi: *See*—
Kato, Hiroshi; Nakada, Hitoshi; Nishiwaki, Isao; Teramoto, Toshio; Yagii, Keikichi; and Niinomi, Masahiro, 4,591,672, Cl. 179-115.5VC.
Nakagawa, Takao: *See*—
Gomi, Shimpei; Arai, Tomio; Mogi, Fumio; Nakagawa, Takao; Miura, Kunio; and Otani, Sugio, 4,591,424, Cl. 208-40.000.
Nakagoshi, Kazuo: *See*—
Sakuma, Masashi; Nakagoshi, Kazuo; Shiraishi, Kazuhisa; and Ozaki, Shoji, 4,591,939, Cl. 360-46.000.
Nakajima, Hiroyuki; Miyamoto, Fumiyuki; Murayama, Masakazu; Oka, Seiji; and Jidai, Eiki, to Mitsubishi Denki Kabushiki Kaisha. Thermosetting resin composition. 4,591,623, Cl. 525-524.000.
Nakajima, Kenji: *See*—
Miyata, Seizo; Tasaka, Shigeru; Saito, Kazuo; Seo, Iwao; Nakajima, Kenji; and Kosaka, Takeshi, 4,591,465, Cl. 264-22.000.
Nakajima, Tetsuo; and Aoi, Tomio, to Honda Giken Kogyo Kabushiki Kaisha. Apparatus for control of transition to auto-cruise. 4,591,986, Cl. 364-426.000.
Nakajima, Toshifumi, to Canon Kabushiki Kaisha. Facsimile device. 4,591,921, Cl. 358-257.000.
Nakamura, Chiaki; Oe, Kouji; Muta, Tomonobu; and Sasaki, Toshiki, to Dainippon Ink and Chemicals, Inc. Photosensitive image-forming material having a layer of photosensitive polyester modified with chain extender. 4,591,545, Cl. 430-284.000.
Nakamura, Hiroaki, to Olympus Optical, Co. Electronic flash. 4,591,762, Cl. 315-241.00P.
Nakamura, Hitoshi: *See*—
Oseto, Seiichi; Fujimura, Itaru; and Nakamura, Hitoshi, 4,591,262, Cl. 355-14.0CH.
Nakamura, Kazuharu; and Nakanishi, Yutaka, to Toyotomi Kogyo Co., Ltd. Automatic fire-extinguishing device for oil burner. 4,591,000, Cl. 169-54.000.
Nakamura, Kiyoji, to Fuji Photo Film Co., Ltd. Optical lens holder. 4,591,239, Cl. 350-254.000.
Nakamura, Kouzaburou: *See*—
Maruno, Tooru; Nakamura, Kouzaburou; and Sasaki, Shigekuni, 4,591,627, Cl. 528-103.000.
Nakamura, Nagatoshi, to Honda Giken Kogyo Kabushiki Kaisha. Bar steps for a small-sized vehicle. 4,591,179, Cl. 280-291.000.

Nakamura, Norihiko; Nomura, Kenichi; and Yoshioka, Mamoru, to Toyota Jidosha Kabushiki Kaisha. Cylinder head gasket having metal core web with hooks. 4,591,170, Cl. 277-235.00B.

Nakamura, Takeshi, to Murata Manufacturing Co., Ltd. Generator for generating an amplitude modulated signal corresponding to a carrier signal modulated by an information signal. 4,591,811, Cl. 332-31.00T.

Nakamura, Yukinori: *See—*
Ono, Tsuneo; and Nakamura, Yukinori, 4,591,322, Cl. 418-48.000.

Nakanishi, Yutaka: *See—*
Nakamura, Kazuharu; and Nakanishi, Yutaka, 4,591,000, Cl. 169-54.000.

Nakano, Masao: *See—*
Takemae, Yoshihiro; Ogawa, Junji; Fujii, Yasuhiro; Nakano, Tomio; Tatematsu, Takeo; Horii, Takashi; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,592,025, Cl. 365-200.000.

Nakano, Tomio: *See—*
Takemae, Yoshihiro; Nakano, Tomio; and Sato, Kimiaki, 4,592,020, Cl. 365-189.000.
Takemae, Yoshihiro; Ogawa, Junji; Fujii, Yasuhiro; Nakano, Tomio; Tatematsu, Takeo; Horii, Takashi; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,592,025, Cl. 365-200.000.

Nakarai, Masazumi; and Kamiya, Hitoshi, to Nippondenso Co., Ltd. Head mounting arrangement in magnetic card reader. 4,591,937, Cl. 360-101.000.

Nakazawa, Toru, to Mita Industrial Co., Ltd. Process for the prevention of the memory effect in an organic photoconductor layer in an electrophotographic process. 4,591,541, Cl. 430-59.000.

Nakazawa, Yoshio: *See—*
Morozumi, Shinji; Misawa, Toshiyuki; and Nakazawa, Yoshio, 4,591,848, Cl. 340-784.000.

Namba Press Works Co., Ltd.: *See—*
Goto, Fumio; and Ogawa, Taro, 4,591,470, Cl. 264-59.000.

Namekawa, Toshihiko; Kasahara, Masao; Tokiwa, Kinichiro; Inoue, Tohru; and Okamura, Shigeru, to Mitsubishi Denki Kabushiki Kaisha. Decoder with code error correcting function. 4,592,054, Cl. 371-39.000.

Nanba, Taro. Saw teeth for hand saws. 4,590,837, Cl. 83-846.000.

Nassau, Lewis; and Sabbah, Mordache. Lambrequin assembly. 4,590,723, Cl. 52-211.000.

National Gypsum Company: *See—*
Schneller, Joseph W.; Kossuth, Donald A.; and Robinson, J. Stephen, 4,590,733, Cl. 52-741.000.

National Industries, Inc.: *See—*
Cusey, Dar L.; and Kitchens, Roy A., 4,591,868, Cl. 343-903.000.

National Research Development Corporation: *See—*
Darlington, John; and Reeve, Michael J., 4,591,971, Cl. 364-200.000.
Dickinson, David J.; and Gray, Scarlette M., 4,591,515, Cl. 427-297.000.
Harrison, Roy; and Turner, John D., 4,590,748, Cl. 53-576.000.
Jones, John H.; and Brown, Tom, 4,591,648, Cl. 548-344.000.

National Semiconductor Corporation: *See—*
Howard, Norman A., 4,590,770, Cl. 62-52.000.
Kung, David, 4,591,743, Cl. 307-491.000.

Natsume, Kazuyuki; and Oohashi, Kaoru, to Nippondenso Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Vehicle height control system. 4,591,185, Cl. 280-707.000.

Natsuyama, Yukihiro: *See—*
Yoshinaga, Toru; Sakakibara, Yasuyuki; Abe, Seiko; Watanabe, Kazuhide; and Natsuyama, Yukihiro, 4,590,908, Cl. 123-357.000.

Nauck, Joachim: *See—*
Guenther, Hans-Jurgen; Nauck, Joachim; Renner, Udo; and Fehse, Wigbert, 4,591,116, Cl. 244-168.000.

Nautech Limited: *See—*
Livings, Rodney; and Singh, Harjit, 4,590,679, Cl. 33-361.000.

Nawaz, M. H. A, to Degussa Aktiengesellschaft. Noble metal alloys for dental uses. 4,591,483, Cl. 420-463.000.

NEC Corporation: *See—*
Asazawa, Hiroshi, 4,591,802, Cl. 330-277.000.
Hirano, Akira, 4,591,908, Cl. 358-136.000.
Itoh, Yasuo, 4,591,670, Cl. 179-170.200.
Iwashita, Masao, 4,591,979, Cl. 364-200.000.
Morito, Hiroshi, 4,591,742, Cl. 307-475.000.
Tanimoto, Yoshio; and Atobe, Masaaki, 4,591,797, Cl. 329-50.000.
Watanabe, Kyoji, 4,592,073, Cl. 375-60.000.

Nehmiz, Peter: *See—*
Bohlen, Harald; Bretscher, Erwin; Engelke, Helmut; Nehmiz, Peter; Vettiger, Peter; and Greschner, Johann, 4,591,540, Cl. 430-22.000.

Neidig, Arno; Bunk, Klaus; Thiele, Karl-Heinz; Wahl, Georg; and Gobrecht, Jens, to Brown, Boveri & Cie Aktiengesellschaft. Process for the direct bonding of metal to ceramics. 4,591,401, Cl. 156-89.000.

Neilson, James D., Jr., to Bailey & Wasson Trading Company. Jewelry catch. 4,590,649, Cl. 24-616.000.

Nelson, John F., to Illinois Tool Works Inc. Rod retainer. 4,591,285, Cl. 403-11.000.

Nelson Research & Development Co.: *See—*
Andrews, Robert S., 4,591,442, Cl. 210-656.000.

Nemoto, Toshiyuki: *See—*
Naito, Sachio; and Nemoto, Toshiyuki, 4,591,497, Cl. 424-43.000.

Nerlich, Horst: *See—*
Mencke, Helmut; Gruner, Hans-Jurgen; Oertmann, Peter; Nerlich, Horst; and Grabasch, Heinz, 4,590,876, Cl. 112-262.300.

Nero, Leroy W., to RCA Corporation. Inductance adjustment for transformers. 4,591,819, Cl. 336-178.000.

Neste Oy: *See—*
Bergstrom, Christer, 4,591,606, Cl. 521-79.000.

Netsushin Co., Ltd.: *See—*
Imamura, Iku, 4,590,669, Cl. 29-612.000.

Neuenschwander, Ernst, to Volpi AG. Safety receptacle. 4,591,732, Cl. 307-140.000.

Neumann, Ulrich: *See—*
Buxel, Ludwig M.; Muhlhaus, Ludwig; and Neumann, Ulrich, 4,591,335, Cl. 432-15.000.

Neurath, A. Robert, to New York Blood Center, Inc. Detection of hepatitis B surface antigen (or antibody to same) with labeled synthetic peptide. 4,591,552, Cl. 435-7.000.

Neves, Billy W.; and Eckel, Emery L., to Eckel Manufacturing Company, Inc. Dual-string tubing tong and method. 4,590,823, Cl. 81-57.140.

New York Blood Center, Inc.: *See—*
Neurath, A. Robert, 4,591,552, Cl. 435-7.000.
Prince, Alfred M., 4,591,505, Cl. 424-101.000.

New York University: *See—*
Rugg, Barry; and Stanton, Robert, 4,591,386, Cl. 127-1.000.

Newell, Isaac L.: *See—*
Jones, William C.; Britt, Kenneth R.; and Newell, Isaac L., 4,591,397, Cl. 148-15.500.

Newland, James F. Seal for a shielding enclosure with opening. 4,590,710, Cl. 49-478.000.

Newsom, Harley M. Interactive learning programming and like control circuitry. 4,591,929, Cl. 360-32.000.

Neynaber Chemie GmbH: *See—*
Worschech, Kurt; Wedl, Peter; and Loffelholz, Frido, 4,591,452, Cl. 252-400.00A.

NGK Insulators, Ltd.: *See—*
Kato, Nobuhide; and Murase, Takao, 4,591,422, Cl. 204-426.000.
Kato, Nobuhide; and Murase, Takao, 4,591,423, Cl. 204-428.000.

NGK Spark Plug Co., Ltd.: *See—*
Ando, Minato; Ito, Masaaki; and Mizuno, Fumio, 4,591,574, Cl. 501-136.000.
Yamada, Tetsusyo; and Hirate, Shintaro, 4,591,421, Cl. 204-406.000.

Nichiryo Co., Ltd.: *See—*
Oshikubo, Yuji, 4,591,072, Cl. 222-44.000.

Nichols, Richard D. E.: *See—*
Bianchi, John E.; and Nichols, Richard D. E., 4,591,081, Cl. 224-192.000.

Nicholson, W. A. Patrick: *See—*
Biddlecombe, William H.; Elder, Hugh Y.; and Nicholson, W. A. Patrick, 4,591,722, Cl. 250-443.100.

Nickel, Horst: *See—*
Herd, Karl J.; and Nickel, Horst, 4,591,634, Cl. 534-570.000.

Nickels, Richard C., Jr.; and Allgaier, Richard L., Jr., to General Instrument Corporation. Modular print head. 4,590,853, Cl. 101-93.480.

Nickoladze, Leo G. Wheel balancing wheel cover. 4,591,210, Cl. 301-5.0BA.

Nicks, David. Foldable and extendable decoy. 4,590,699, Cl. 43-2.000.

Niederer, Kurt W., to Belmont Textile Machinery Company. Method and apparatus for automatically doffing and donning take-up packages on a winder. 4,591,105, Cl. 242-18.00A.

Niethammer, Rudolf: *See—*
Orzikowski, Gunter; Niethammer, Rudolf; and Bahr, Jochen, 4,591,881, Cl. 346-117.00R.

Niinomi, Masahiro: *See—*
Kato, Hiroshi; Nakada, Hitoshi; Nishiwaki, Isao; Teramoto, Toshio; Yagii, Keikichi; and Niinomi, Masahiro, 4,591,672, Cl. 179-115.5VC.

Nilssen, Ole K. Plug-in auxiliary tracks for track lighting systems. 4,591,764, Cl. 315-312.000.

Nilsson, Gert, to Perimed KB. Method and apparatus for measuring the blood flow in the superficial blood vessels of tissue. 4,590,948, Cl. 128-666.000.

Nippon Electric Co., Ltd.: *See—*
Mori, Toshihiro, 4,591,853, Cl. 340-825.440.
Watari, Masao; and Sakoe, Hiroaki, 4,592,086, Cl. 381-43.000.

Nippon Kogaku K. K.: *See—*
Aono, Yasuhiro; and Matsumoto, Koichi, 4,591,244, Cl. 350-427.000.
Hamanishi, Yoshinari, 4,591,234, Cl. 350-422.000.

Nippon Kokan Kabushiki Kaisha: *See—*
Honda, Akira; Yanagihashi, Yasuo; and Kumagai, Shinobu, 4,590,985, Cl. 164-440.000.
Okabe, Jiro; Fujie, Shunji; and Takeuchi, Haruki, 4,590,784, Cl. 72-389.000.
Yoshihara, Tetsuya, 4,591,080, Cl. 222-598.000.

Nippon Petrochemicals Company, Limited: *See—*
Sato, Atsushi; Endo, Keiji; Kawakami, Shigenobu; and Dohi, Hideyuki, 4,591,948, Cl. 361-315.000.

Nippon Rotary Nozzle Co., Ltd.: *See—*
Yoshihara, Tetsuya, 4,591,080, Cl. 222-598.000.

Nippon Soken, Inc.: *See—*
Mifuji, Ken; and Shibata, Norio, 4,590,762, Cl. 60-293.000.
Yoshinaga, Toru; Sakakibara, Yasuyuki; Abe, Seiko; Watanabe, Kazuhide; and Natsuyama, Yukihiro, 4,590,908, Cl. 123-357.000.

Nippon Steel Corporation: *See—*
Fukuoka, Hiromi; Asano, Keisuke; and Ide, Hideo, 4,590,988, Cl. 164-463.000.
Mazuda, Hiroo; Tamehiro, Hiroshi; Ohashi, Mamoru; Onoe, Yasumitsu; and Tamukai, Shinogu, 4,591,396, Cl. 148-12.00F.

Ohtsubo, Takashi; Kawase, Hirahisa; and Goto, Syunsuke, 4,590,809, Cl. 73-863.530.
Umeno, Masaki; Fukuda, Keiji; and Onoe, Yasumitsu, 4,591,133, Cl. 266-114.000.

Nippon Telegraph & Telephone Public Corp.: *See—*
Kuroda, Hideo; and Mukawa, Naoki, 4,591,909, Cl. 358-136.000.
Maruno, Tooru; Nakamura, Kouzaburou; and Sasaki, Shigekuni, 4,591,627, Cl. 528-103.000.
Yamaguchi, Masafumi; Yamamoto, Akio; and Uemura, Chikao, 4,591,654, Cl. 136-252.000.

Nippondenso Co., Ltd.: *See—*
Matsuda, Takeshi; Miyamoto, Masasi; and Takei, Toshihiro, 4,591,311, Cl. 415-53.00T.
Nakarai, Masazumi; and Kamiya, Hitoshi, 4,591,937, Cl. 360-101.000.
Natsume, Kazuyuki; and Oohashi, Kaoru, 4,591,185, Cl. 280-707.000.

NIS Engineering Limited: *See—*
Foulkes, Thomas L., 4,591,294, Cl. 405-170.000.

Nishigaki, Noriaki: *See—*
Tanaka, Kazuyuki; and Nishigaki, Noriaki, 4,590,976, Cl. 141-66.000.

Nishijima, Kounosuke: *See—*
Kawashima, Yukio; and Nishijima, Kounosuke, 4,590,693, Cl. 36-126.000.

Nishikawa, Kohei: *See—*
Sugihara, Hirosada; Nishikawa, Kohei; and Ito, Katsumi, 4,591,458, Cl. 260-239.30B.

Nishimatsu, Masaharu; Ide, Toshiaki; Kubota, Yuichi; Saito, Yoshiaki; and Arioka, Hiroyuki, to TDK Corporation. Magnetic recording medium. 4,591,528, Cl. 428-212.000.

Nishino, Fumio; Onoda, Shigeyoshi; Nomura, Akihiro; Mizutani, Morikazu; Kanemitsu, Shinji; and Toriumi, Mototada, to Canon Kabushiki Kaisha. Safety means for process kit. 4,591,258, Cl. 355-3.00R.

Nishino, Yukishige: *See—*
Kerb, Ulrich; Sauer, Gerhard; Wiechert, Rudolf; Henderson, David; Nishino, Yukishige; and Beier, Sybille, 4,591,585, Cl. 514-177.000.

Nishioka, Hisao: *See—*
Watari, Masao; Akabane, Makoto; Nishioka, Hisao; and Waku, Toshihiko, 4,592,085, Cl. 381-43.000.

Nishita, Shigeo; Yamakido, Kazuo; and Ohwada, Kenichi, to Hitachi, Ltd.; and Hitachi Micro Computer Engineering Ltd. PCM coder-decoder. 4,591,827, Cl. 340-347.00C.

Nishiwaki, Isao: *See—*
Kato, Hiroshi; Nakada, Hitoshi; Nishiwaki, Isao; Teramoto, Toshio; Yagii, Keikichi; and Niinomi, Masahiro, 4,591,672, Cl. 179-115.5VC.

Nishizaki, Kan: *See—*
Kubo, Akira; Nishizaki, Kan; and Okado, Yasuomi, 4,591,609, Cl. 523-336.000.

Nissan Motor Company, Limited: *See—*
Fukuhara, Hiroshige, 4,591,860, Cl. 343-390.000.
Hagiwara, Yutaca; Kitamura, Terukiyo; and Murakami, Hideto, 4,591,028, Cl. 188-72.200.
Hayashi, Yoshimasa, 4,590,900, Cl. 123-90.670.
Hirano, Yoshinori, 4,590,893, Cl. 123-41.210.
Ishida, Yoshiyuki; and Taguchi, Yosio, 4,590,894, Cl. 123-41.740.
Kajiura, Takatsugu, 4,590,654, Cl. 29-407.000.
Nose, Toshimitsu; and Ohashi, Toshio, 4,590,772, Cl. 62-184.000.
Nose, Toshimitsu; and Ohashi, Toshio, 4,590,892, Cl. 123-41.120.
Takahashi, Teruo; and Hayashi, Isao, 4,591,319, Cl. 417-360.000.
Tanaka, Hiroshi; Mitani, Sotozi; and Sakurai, Yasushi, 4,590,783, Cl. 72-384.000.

Nissen, Stanley M.; Grobicki, Chris J.; and Kaupinis, William M., to United States of America, Air Force. Plurality of processors where access to the common memory requires only a single clock interval. 4,591,977, Cl. 364-200.000.

Nissho Corporation: *See—*
Shimoda, Keitaro, 4,590,800, Cl. 73-449.000.

Nistri, Ugo; Baroffio, Romano; and Colombo, Paolo, to Mira Lanza S.p.A. Process for the preparation of a bleaching activator in granular form. 4,591,450, Cl. 252-135.000.

Nithammer, Egon; Ligensa, Karl H.; and Kresky, Fred C., to Keiper Recaro Inc. Continuously variable adjustable hinge. 4,591,207, Cl. 297-366.000.

NL Industries, Inc.: *See—*
Hargett, Hoke S.; Barton, Charles E.; and Boles, William D., 4,591,226, Cl. 339-117.00R.

Noack, Rainer: *See—*
Hugo, Peter; and Noack, Rainer, 4,591,645, Cl. 548-142.000.

Noble, Scott W.; Burke, Timothy M.; and Lynk, Charles N., Jr., to Motorola, Inc. General purpose data control system. 4,591,851, Cl. 340-825.070.

Noguchi, Akio, to Fuji Xerox Co., Ltd. Color image data processing device for correcting red ghosts of black images. 4,591,905, Cl. 358-75.000.

Noguchi, Masaru: *See—*
Goto, Chiaki; Horikawa, Kazuo; and Noguchi, Masaru, 4,591,714, Cl. 250-327.200.

Noguchi, Toushi: *See—*
Enjo, Sadamichi; Tsukiji, Yasuhiko; Wakatsuki, Goroei; and Noguchi, Toushi, 4,591,017, Cl. 180-205.000.

Noller, Friedemann: *See—*
Koch, Dieter; and Noller, Friedemann, 4,591,688, Cl. 219-121.0EV.

Nomori, Hiroyuki: *See—*
Fujimaki, Yoshihide; Kudo, Koichi; Takei, Yoshiaki; and Nomori, Hiroyuki, 4,591,542, Cl. 430-59.000.

Nomura, Akihiro: *See—*
Nishino, Fumio; Onoda, Shigeyoshi; Nomura, Akihiro; Mizutani, Morikazu; Kanemitsu, Shinji; and Toriumi, Mototada, 4,591,258, Cl. 355-3.00R.

Nomura, Kenichi: *See—*
Nakamura, Norihiko; Nomura, Kenichi; and Yoshioka, Mamoru, 4,591,170, Cl. 277-235.00B.

Nopper, Guido H., to ITT Industries, Inc. Overflow detector for algebraic adders. 4,592,008, Cl. 364-784.000.

Nordica S.p.A.: *See—*
Leonardi, Alfio, 4,590,692, Cl. 36-120.000.

Nordischer Maschinenbau Rud. Baader GmbH & Co. KG: *See—*
Wenzel, Werner, 4,591,045, Cl. 198-456.000.

Nordson Corporation: *See—*
Dohrendorf, Hans A., 4,590,735, Cl. 53-77.000.
Kreeger, Ken; and Tank, Gene, 4,590,884, Cl. 118-308.000.

Noren, Jan O.: *See—*
Helgstrand, Ake J. E.; Johansson, Karl N.; Misiorny, Alfons; Noren, Jan O.; and Stening, Goran B., 4,591,583, Cl. 514-120.000.

Norota, Kenji, to Makino Milling Machine Co., Ltd. Tool changing machine of machine tool. 4,590,662, Cl. 29-568.000.

Norris, Robert D.: *See—*
Brown, Richard A.; and Norris, Robert D., 4,591,443, Cl. 210-747.000.

Nortey, Samuel O.: *See—*
Maryanoff, Bruce E.; and Nortey, Samuel O., 4,591,601, Cl. 514-462.000.

North American Philips Corporation: *See—*
Soden, George B.; and Miller, Gerald J., 4,591,747, Cl. 310-71.000.

Northern Telecom Limited: *See—*
Bouffard, Jean; Dumoulin, Andre ; and Seguin, Marc, 4,590,754, Cl. 57-58.550.
Charlebois, Leonard J.; and Brown, Peter A., 4,591,330, Cl. 425-567.000.
Chow, Peter E.; Weirich, Andreas H.; and Strawczynski, Leo, 4,592,070, Cl. 375-27.000.
Garner, John N., 4,590,755, Cl. 57-293.000.
Sims, Dewey M., Jr., 4,591,934, Cl. 360-93.000.

Norton, Jerry J., to Phillips Petroleum Company. NRZ digital data recovery. 4,592,077, Cl. 375-110.000.

Norvale AB: *See—*
Eriksson, Hans E., 4,591,075, Cl. 222-195.000.

Nose, Toshimitsu; and Ohashi, Toshio, to Nissan Motor Co., Ltd. Air conditioning system for vehicle. 4,590,772, Cl. 62-184.000.

Nose, Toshimitsu; and Ohashi, Toshio, to Nissan Motor Co., Ltd. Cooling system for vehicle. 4,590,892, Cl. 123-41.120.

Novatel Communications Ltd.: *See—*
El-Banna, Mahmoud A. S., 4,592,076, Cl. 375-108.000.

Novo Industri A/S: *See—*
Branner-Jorgensen, Sven; Schneider, Palle; and Eigtved, Peter, 4,591,565, Cl. 435-223.000.

Nowak, Ralph M.: *See—*
McDonald, Quentin H.; Panicci, Richard L.; and Nowak, Ralph M., 4,591,208, Cl. 297-487.000.

Nozaki, Mineo; Asakura, Osamu; Nagashima, Masasumi; and Uchikata, Yoshio, to Canon Kabushiki Kaisha. Thermal printer. 4,591,876, Cl. 346-76.0PH.

Nozawa, Ryoichiro; Nagamine, Tsuyoshi; Kawamura, Hideaki; and Fujibayashi, Kentaro, to Fanuc Ltd. Numerical control system. 4,591,771, Cl. 318-569.000.

Nozawa, Ryoichiro; Kawamura, Hideaki; and Miyata, Mitsuto, to Fanuc Ltd. Numerical control method. 4,591,968, Cl. 364-167.000.

Nozawa, Ryoichiro; and Kiya, Nobuyuki, to Fanuc Ltd. Spindle rotational frequency checking method. 4,591,990, Cl. 364-474.000.

Numata, Hidetaka, to Alps Electric Co., Ltd. Motor driving circuit for motor actuator. 4,591,773, Cl. 318-663.000.

NUS Corporation: *See—*
Weitzberg, Abraham, 4,591,479, Cl. 376-349.000.

Nussel, Lothar; and Radmer, Alfred, to Siemens Aktiengesellschaft. Electric synchronous machine which is excited via rotating rectifiers. 4,591,775, Cl. 318-711.000.

Nyce, Andrew C., to Gorham International, Inc. Pressure assisted sinter process. 4,591,482, Cl. 419-38.000.

O/Y Kyro A/B Tamglass: *See—*
Klemola, Jorma J., 4,591,374, Cl. 65-350.000.

Oak Industries Inc.: *See—*
Davidov, Mircho A.; and Katzfey, Lance, 4,591,915, Cl. 358-194.100.

Obermeier, Manfred, to Inkoma. Compensator coupling. 4,591,350, Cl. 464-138.000.

O'Brien, Thomas P., to Tokyo Shibaura Denki Kabushiki Kaisha. High speed x-ray shutter. 4,592,083, Cl. 378-160.000.

Ochiai, Atsuhiro: *See—*
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Yanagida, Koji; Kitagawa, Kazuo; Ochiai, Atsuhiro; Harada, Minoru; and Matsumoto, Hiroshi, 4,591,454, Cl. 252-626.000.

O'Connor, Richard K., to Racal Safety Limited. Breathing apparatus. 4,590,951, Cl. 128-204.230.

Octa, Inc.: *See—*
Tucker, Hartwell F.; Tucker, Jeffrey R.; Ross, Dennis; and Knirck, Jeffrey G., 4,590,635, Cl. 15-50.00R.

Oe, Kouji: *See—*
Nakamura, Chiaki; Oe, Kouji; Muta, Tomonobu; and Sasaki, Toshiki, 4,591,545, Cl. 430-284.000.

Oertmann, Peter: *See—*
Mencke, Helmut; Gruner, Hans-Jurgen; Oertmann, Peter; Nerlich, Horst; and Grabasch, Heinz, 4,590,876, Cl. 112-262.300.

Oetiker, Hans; and Kummer, Emanuel, to Gerbruder Buhler AG. Process and device for continuously determining the moisture content of spoilable foodstuffs. 4,590,795, Cl. 73-73.000.

Officine Savio S.p.A.: *See—*
Bertoli, Luciano; Badiali, Roberto; and Speranzin, Claudio, 4,590,753, Cl. 57-22.000.

Ogami, Nobutoshi; and Mori, Noritaki, to Dainippon Screen Mfg. Co. Ltd. Apparatus for feeding wafers and the like. 4,591,044, Cl. 198-346.300.

Ogawa, Junji: *See—*
Takemae, Yoshihiro; Ogawa, Junji; Fujii, Yasuhiro; Nakano, Tomio; Tatematsu, Takeo; Horii, Takashi; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,592,025, Cl. 365-200.000.

Ogawa, Kiyoshi: *See—*
Hakamada, Kunio; Ishiguro, Satoshi; Wakabayashi, Hideo; and Ogawa, Kiyoshi, 4,591,914, Cl. 358-190.000.

Ogawa, Noriaki: *See—*
Asagi, Yasuyoshi; Ogawa, Noriaki; Kasai, Hitoshi; Hattori, Toshihiro; Ishihara, Masaki; and Uriuhara, Makoto, 4,591,038, Cl. 192-0.073.

Ogawa, Taro: *See—*
Goto, Fumio; and Ogawa, Taro, 4,591,470, Cl. 264-59.000.

Ogino, Nobukuni: *See—*
Iwamoto, Shigeyoshi; Saeki, Yoshifumi; Kuribayashi, Takashi; Ishitsuka, Shinichiro; and Ogino, Nobukuni, 4,591,951, Cl. 361-417.000.

Ogino, Shuji: *See—*
Tokumaru, Hisashi; and Ogino, Shuji, 4,591,235, Cl. 350-427.000.

Ohashi, Mamoru: *See—*
Mazuda, Hiroo; Tamehiro, Hiroshi; Ohashi, Mamoru; Onoe, Yasumitsu; and Tamukai, Shinogu, 4,591,396, Cl. 148-12.00F.

Ohashi, Toshio: *See—*
Nose, Toshimitsu; and Ohashi, Toshio, 4,590,772, Cl. 62-184.000.
Nose, Toshimitsu; and Ohashi, Toshio, 4,590,892, Cl. 123-41.120.

Ohhashi, Masahide, to Tokyo Shibaura Denki Kabushiki Kaisha. Full adder using complementary MOSFETs. 4,592,007, Cl. 364-784.000.

Ohnishi, Haruo; Kosuzume, Hiroshi; Suzuki, Yasuo; and Mochida, Ei, to Mochida Pharmaceutical Co., Ltd. Human leucocyte pepsin-like enzyme as a therapeutic agent for treating allergic disorders and immune complex diseases. 4,591,504, Cl. 424-94.000.

Ohnishi, Hiroshi; and Yamashita, Sadahiko, to Matsushita Electric Industrial Co., Ltd. Microwave FET mixer arranged to receive RF input at gate electrode. 4,592,095, Cl. 455-327.000.

Ohnuki, Hideo, to Hitachi, Ltd. Device for displacing a pickup head in multi-axial directions. 4,592,037, Cl. 369-44.000.

Ohsaki, Kiyoshi, to U.S. Philips Corporation. Disc-record player with a pressure lever carrying a pressure member. 4,592,040, Cl. 369-77.100.

Ohta, Kazufumi, to Yokogawa Hokushin Electric Corporation. Recorder with functions to correct expansion or contraction of recording paper. 4,591,871, Cl. 346-49.000.

Ohta, Takao: *See—*
Kobayashi, Toshiyuki; Ohta, Takao; Miura, Masatsugu; and Matsumoto, Hidetoshi, 4,592,003, Cl. 364-579.000.

Ohta, Tatsuo: *See—*
Sasa, Nobumasa; Sato, Yuzuru; Ohta, Tatsuo; and Shindo, Masanari, 4,591,544, Cl. 430-166.000.

Ohtsu, Takaji: *See—*
Soneda, Mitsuo; Maekawa, Toshikazu; and Ohtsu, Takaji, 4,591,916, Cl. 358-213.000.

Ohtsubo, Takashi; Kawase, Hirahisa; and Goto, Syunsuke, to Nippon Steel Corporation; and Japan Analyst Corporation. Sampler and an apparatus for hydrogen determination in molten metal. 4,590,809, Cl. 73-863.530.

Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Yanagida, Koji; Kitagawa, Kazuo; Ochiai, Atsuhiro; Harada, Minoru; and Matsumoto, Hiroshi, to Doryokuro Kakunenryo Kaihatsu Jigyodan. Apparatus and method for melting and treating metal wastes. 4,591,454, Cl. 252-626.000.

Ohwada, Kenichi: *See—*
Nishita, Shigeo; Yamakido, Kazuo; and Ohwada, Kenichi, 4,591,827, Cl. 340-347.00C.

Oka, Seiji: *See—*
Nakajima, Hiroyuki; Miyamoto, Fumiyuki; Murayama, Masakazu; Oka, Seiji; and Jidai, Eiki, 4,591,623, Cl. 525-524.000.

Okabayashi, Minahiro; Yuasa, Shigeki; and Kusumoto, Koshi, to Tokuyama Soda Kabushiki Kaisha. Novel crystalline metal oxide and process for production thereof. 4,591,575, Cl. 501-154.000.

Okabe, Jiro; Fujie, Shunji; and Takeuchi, Haruki, to Nippon Kokan Kabushiki Kaisha. Press brake. 4,590,784, Cl. 72-389.000.

Okada, Takashi: *See—*
Tanaka, Yutaka; and Okada, Takashi, 4,591,911, Cl. 358-160.000.

Okada, Yoshinori: *See—*
Miura, Kuniaki; Okada, Yoshinori; Fukushima, Isao; and Tamura, Teizo, 4,591,924, Cl. 358-330.000.

Okado, Yasuomi: *See—*
Kubo, Akira; Nishizaki, Kan; and Okado, Yasuomi, 4,591,609, Cl. 523-336.000.

Okamura, Shigeru: *See—*
Namekawa, Toshihiko; Kasahara, Masao; Tokiwa, Kinichiro; Inoue, Tohru; and Okamura, Shigeru, 4,592,054, Cl. 371-39.000.

Okawara Mfg. Co., Ltd.: *See—*
Kubota, Atsushi, 4,591,324, Cl. 425-222.000.

Okazaki, Syunki: *See—*
Yada, Yoshikuni; and Okazaki, Syunki, 4,590,895, Cl. 123-52.0MB.

Okinoshima, Hiroshige, to Shin-Etsu Chemical Co., Ltd. Ultraviolet-curable organopolysiloxane composition. 4,591,608, Cl. 522-13.000.

Okumura, Jun: *See—*
Hoshi, Hideaki; Okumura, Jun; Naito, Takayuki; Abe, Yoshio; and Aburaki, Shimpei, 4,591,641, Cl. 544-16.000.

Okumura, Tadashi: *See—*
Funyu, Yutaka; Okumura, Tadashi; Monno, Asao; and Shimizu, Masami, 4,590,658, Cl. 29-464.000.

Okunishi, Masahiko: *See—*
Koumura, Ichiro; Kanou, Hideo; Okunishi, Masahiko; and Yamada, Kazuhiko, 4,591,554, Cl. 435-18.000.

Old, Lloyd J.: *See—*
Mattes, M. Jules; Thomson, Timothy M.; Old, Lloyd J.; and Lloyd, Kenneth O., 4,591,572, Cl. 436-538.000.

Oldershaw, Paul V.: *See—*
Hutchison, Stanley O.; Oldershaw, Paul V.; and Hansen, James E., 4,591,006, Cl. 175-52.000.

Olin Corporation: *See—*
Dixit, Ajit S., 4,590,955, Cl. 131-365.000.

Oliver, Michael S., to Smith International, Inc. Lube reservoir protection for rock bits. 4,591,008, Cl. 175-227.000.

Oliviero, Olivieri, to Icaro Olivieri & C. S.p.A. Device for pressing the tongue of a ski boot on to the instep of the wearer of the boot. 4,590,691, Cl. 36-119.000.

Olschewski, Armin; Brandenstein, Manfred; Walter, Lothar; and Ernst, Horst M., to SKF Kugellagerfabriken GmbH. Tension roller. 4,591,352, Cl. 474-95.000.

Olsen, Arthur M.: *See—*
Bozarth, Theodore B., Jr.; Olsen, Arthur M.; and Rowlands, Ronald H., 4,592,002, Cl. 364-571.000.

Olsen, William L.; Freeborn, John O.; Shaver, Linnea J.; and Kelemen, Janice J., to International Paper Company. Method and apparatus for sonicating articles. 4,591,485, Cl. 422-20.000.

Olson, James C. Bottle cap remover. 4,590,821, Cl. 81-3.370.

Olson, John B.: *See—*
Jeanson, Richard L.; and Olson, John B., 4,591,187, Cl. 281-45.000.

Olson, Philip D.: *See—*
Beckner, Mark W.; Davis, James A.; Gausmann, Eric J.; Hiller, Thomas L.; Olson, Philip D.; and Van Dine, Gilbert A., 4,592,048, Cl. 370-60.000.

Oltman, John E.; Carpenter, Denis D.; and Dopp, Robert B., to Rayovac Corporation. Metal-air cathode button cell. 4,591,539, Cl. 429-27.000.

Oltmanns, Heinrich; Granz, Axel; Dalhoff, Willi; and Othold, Rolf, to Oltmanns Ziegel und Kunststoffe GmbH. Line pipe of synthetic material especially for waste water. 4,591,193, Cl. 285-138.000.

Oltmanns Ziegel und Kunststoffe GmbH: *See—*
Oltmanns, Heinrich; Granz, Axel; Dalhoff, Willi; and Othold, Rolf, 4,591,193, Cl. 285-138.000.

Olympus Optical, Co.: *See—*
Nakamura, Hiroaki, 4,591,762, Cl. 315-241.00P.

Olympus Optical Co., Ltd.: *See—*
Banno, Taiichi; Fujimori, Ryo; Takekawa, Hiroshi; and Hijikata, Kazuo, 4,591,568, Cl. 436-180.000.
Tanikawa, Kouji; Matsui, Koichi; Taniguchi, Akira; Amano, Atsushi; Kanno, Masahide; and Takahashi, Yutaka, 4,590,924, Cl. 128-6.000.
Yamagishi, Masaaki, 4,591,243, Cl. 350-414.000.

Omark Industries, Inc.: *See—*
Doiron, Gerald J., 4,590,836, Cl. 83-834.000.

Omori, Tatsuya: *See—*
Hino, Masanori; Kato, Toshiji; and Omori, Tatsuya, 4,591,667, Cl. 179-115.5ES.

Omron Tateisi Electronics Co.: *See—*
Hisano, Atushi, 4,591,918, Cl. 358-225.000.
Kobayashi, Toshiyuki; Ohta, Takao; Miura, Masatsugu; and Matsumoto, Hidetoshi, 4,592,003, Cl. 364-579.000.
Matsuura, Toshimi, 4,592,053, Cl. 371-29.000.

O'Neill, Jay H.: *See—*
Huang, Alan; and O'Neill, Jay H., 4,592,019, Cl. 365-78.000.

Onishi, Junko, administratrix: *See—*
Sakai, Kikuo; Onishi, Yoshiaki, deceased; and Onishi, Junko, administratrix, 4,592,024, Cl. 365-200.000.

Onishi, Yoshiaki, deceased: *See—*
Sakai, Kikuo; Onishi, Yoshiaki, deceased; and Onishi, Junko, administratrix, 4,592,024, Cl. 365-200.000.

Onkyo Kabushiki Kaisha: *See—*
Hino, Masanori; Kato, Toshiji; and Omori, Tatsuya, 4,591,667, Cl. 179-115.5ES.

Ono, Shoziro, to Mitsubishi Denki Kabushiki Kaisha. Field coil assembly for a dynamoelectric machine. 4,591,751, Cl. 310-269.000.

Ono, Taizo: *See—*
Yokoyama, Kazumasa; Fukaya, Chikara; Isuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,591,593, Cl. 514-307.000.
Yokoyama, Kazumasa; Fukaya, Chikara; Tsuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,591,599, Cl. 514-413.000.

Ono, Tsuneo; and Nakamura, Yukinori, to Heishin Sobi Kabushiki Kaisha. Eccentric archimedian screw pump of rotary displacement type. 4,591,322, Cl. 418-48.000.

Onoda, Shigeyoshi: *See*—
Nishino, Fumio; Onoda, Shigeyoshi; Nomura, Akihiro; Mizutani, Morikazu; Kanemitsu, Shinji; and Toriumi, Mototada, 4,591,258, Cl. 355-3.00R.
Onoe, Yasumitsu: *See*—
Mazuda, Hiroo; Tamehiro, Hiroshi; Ohashi, Mamoru; Onoe, Yasumitsu; and Tamukai, Shinogu, 4,591,396, Cl. 148-12.00F.
Umeno, Masaki; Fukuda, Keiji; and Onoe, Yasumitsu, 4,591,133, Cl. 266-114.000.
Onufriev, Vladislav N.: *See*—
Pryadkin, Pavel P.; Pertsev, Leonid P.; Ziborov, Viktor S.; Pichakhchi, Alexandr F.; Malyshkin, Alexandr A.; and Onufriev, Vladislav N., 4,591,435, Cl. 210-230.000.
Oohashi, Kaoru: *See*—
Natsume, Kazuyuki; and Oohashi, Kaoru, 4,591,185, Cl. 280-707.000.
Ooishi, Kazuya: *See*—
Umeda, Takao; Ooishi, Kazuya; Igawa, Tatsuo; Hori, Yasuro; Nagae, Yoshiharu; and Isogai, Masato, 4,591,886, Cl. 346-160.000.
Opas, George F., to Motorola, Inc. Linear power amplifier feedback improvement. 4,591,800, Cl. 330-86.000.
Oppelt, Ralph: *See*—
Altmann, Franz; Granz, Bernd; Grenda, Dieter; and Oppelt, Ralph, 4,592,029, Cl. 367-7.000.
Opprecht, Paul: *See*—
Urech, Werner, 4,591,687, Cl. 219-93.000.
Optikon Oftalmologia, S.p.A.: *See*—
Ranalli, Domenico, 4,590,935, Cl. 128-305.000.
Optimizer, Limited: *See*—
Rosky, Leon; Anslow, Gabriel T.; Spaniola, Daniel F.; and Weintraub, Marvin H., 4,590,914, Cl. 123-557.000.
Orain, Michel A.: *See*—
Balken, Jochen; Krude, Werner; and Orain, Michel A., 4,591,212, Cl. 301-105.00R.
Oram, John A. Operating theatre table light. 4,591,953, Cl. 362-33.000.
Orange Julius International, Inc.: *See*—
Mayer, David, 4,590,851, Cl. 99-455.000.
Mayer, David; and Hall, James F., Jr., 4,590,852, Cl. 99-455.000.
ORC Manufacturing Co., Ltd.: *See*—
Fuse, Yoshiro; Naganuma, Takao; Fujimori, Akiyoshi; Arai, Kozo; Igarashi, Katsutoshi; and Naito, Yuzi, 4,591,724, Cl. 250-492.100.
Ortiz-Salinas, Jorge E.: *See*—
Morales-Garza, Fernando; Morales-Garza, Oscar; and Ortiz-Salinas, Jorge E., 4,591,906, Cl. 358-84.000.
Orzikowski, Gunter; Niethammer, Rudolf; and Bahr, Jochen, to Hellige GmbH. Arm-deflecting system for recording apparatus. 4,591,881, Cl. 346-117.00R.
Osaki, Sigemi: *See*—
Morishita, Tsuyoshi; Osaki, Sigemi; Sakai, Noriyuki; and Kawado, Yasuhumi, 4,591,480, Cl. 419-9.000.
Osawa Press Mfg. Co., Ltd.: *See*—
Shiga, Takashi, 4,591,036, Cl. 192-27.000.
Oseto, Seiichi; Fujimura, Itaru; and Nakamura, Hitoshi, to Ricoh Company, Ltd. Electrostatic copying apparatus. 4,591,262, Cl. 355-14.0CH.
Oshikubo, Yuji, to Nichiryo Co., Ltd. Repeating dispenser. 4,591,072, Cl. 222-44.000.
Ota, Akiho: *See*—
Tsukada, Takami; Ota, Akiho; and Sugiura, Hiroaki, 4,591,060, Cl. 215-1.00C.
Otagawa, Takaaki: *See*—
Zaromb, Solomon; Otagawa, Takaaki; and Stetter, Joseph R., 4,591,414, Cl. 204-1.00T.
Otani, Sugio: *See*—
Gomi, Shimpei; Arai, Tomio; Mogi, Fumio; Nakagawa, Takao; Miura, Kunio; and Otani, Sugio, 4,591,424, Cl. 208-40.000.
Othold, Rolf: *See*—
Oltmanns, Heinrich; Granz, Axel; Dalhoff, Willi; and Othold, Rolf, 4,591,193, Cl. 285-138.000.
O'Toole, Michael P.: *See*—
Foley, Henry C.; and O'Toole, Michael P., 4,591,578, Cl. 502-185.000.
Ouchi, Koji; Tsurumaru, Shinobu; Kajiwara, Tadashi; and Kumamoto, Kenichiro, to Sony Corporation. Super high frequency receiver. 4,592,093, Cl. 455-4.000.
Ouchi, Norikazu; Kayanuma, Akio; and Asano, Katsuaki, to Sony Corporation. Method for manufacturing a semiconductor device utilizing self-aligned oxide-nitride masking. 4,591,398, Cl. 148-187.000.
Outboard Marine Corporation: *See*—
Bailey, Francis V.; and Waskiewicz, John J., 4,590,987, Cl. 164-457.000.
Outsuka, Shuichi; and Kimura, Akinori, to Fuji Photo Film Co., Ltd. Method of purging excess of liquid developer in electrophotographic apparatus. 4,591,543, Cl. 430-125.000.
Overly, Inc.: *See*—
Whipple, Rodger E.; and Curtis, Richard H., 4,591,517, Cl. 427-378.000.
Owaki, Isao; and Saito, Susumu, to Victor Company of Japan, Ltd. Magnetic tape having multiple tracks and recording apparatus therefor. 4,591,927, Cl. 360-15.000.
Owens, Alexander H.; Halfacre, Mark A.; Huie, Wing K.; and Pan, David S., to Solid State Scientific, Inc. Method for double doping sources and drains in an EPROM. 4,590,665, Cl. 29-571.000.
Owens-Corning Fiberglas Corporation: *See*—
Uffner, William E., 4,591,531, Cl. 428-468.000.
Owens, Joe M. User-mounted concrete screed. 4,591,291, Cl. 404-118.000.
Oy Tampella AB: *See*—
Paivalainen, Ossi; and Hakkinen, Leo, 4,591,005, Cl. 173-164.000.
Oy Wartsila AB: *See*—
Korppoo, Seppo; and Landtman, Martin, 4,591,015, Cl. 180-119.000.
Oyama, Yoshishige: *See*—
Yamauchi, Teruo; and Oyama, Yoshishige, 4,590,915, Cl. 123-590.000.
Ozaki, Shoji: *See*—
Sakuma, Masashi; Nakagoshi, Kazuo; Shiraishi, Kazuhisa; and Ozaki, Shoji, 4,591,939, Cl. 360-46.000.
Packwood, Russel J.: *See*—
Samson, Ronald; and Packwood, Russel J., 4,591,158, Cl. 273-87.400.
Paeschke, Otto: *See*—
Schneider, Karl-Heinz; Paeschke, Otto; Del Fabro, Michael; and Loeser, Norbert, 4,591,276, Cl. 384-206.000.
Paivalainen, Ossi; and Hakkinen, Leo, to Oy Tampella AB. Drill rod opening device for sectional-rod drilling equipment. 4,591,005, Cl. 173-164.000.
Pakel, John E.: *See*—
Klima, Dennis P.; and Pakel, John E., 4,591,988, Cl. 364-464.000.
Palac, Kazimir, to Zenith Electronics Corporation. Method of fabricating a tension mask color cathode ray tube. 4,591,344, Cl. 445-30.000.
Palkin, Leonid N.: *See*—
Shaginian, Albert S.; Pevnev, Anatoly A.; Asan-Dzhalalov, Alexei G.; Androsenko, Alexandr P.; Palkin, Leonid N.; and Klimovich, Elena I., 4,591,007, Cl. 175-85.000.
Palombo, Gaston: *See*—
Ferris, Timothy A.; Fortescue, Stephen M.; and Palombo, Gaston, 4,591,774, Cl. 318-696.000.
Palumbo, Paul S.: *See*—
Meneghini, Frank A.; and Palumbo, Paul S., 4,591,646, Cl. 548-146.000.
Pan, David S.: *See*—
Owens, Alexander H.; Halfacre, Mark A.; Huie, Wing K.; and Pan, David S., 4,590,665, Cl. 29-571.000.
Panayappan, Ramanathan; and Cooper, John C., to United States of America, Navy. Rusty bolt intermodulation interference reducer. 4,591,510, Cl. 427-125.000.
Pandell, Nestor W., to Weathermate Marine Manufacturing, Inc. Tarpaulin edge-finished for single line tie-down. 4,590,715, Cl. 52-3.000.
Panicci, Richard L.: *See*—
McDonald, Quentin H.; Panicci, Richard L.; and Nowak, Ralph M., 4,591,208, Cl. 297-487.000.
Pappmann, Wilfried: *See*—
Wohner, Hans J.; Pappmann, Wilfried; and Diemer, Peter, 4,591,366, Cl. 55-20.000.
Parce, John W.: *See*—
Hafeman, Dean; Parce, John W.; and McConnell, Harden M., 4,591,550, Cl. 435-4.000.
Parco Mast and Substructure, Inc.: *See*—
Reed, Lowell M., 4,590,720, Cl. 52-121.000.
Parente, Richard E.; and De LaCruz, Richard, to Callaway Hickory Stick-USA, Inc. Golf club shaft. 4,591,157, Cl. 273-80.00B.
Paris, Marc: *See*—
Beaubatie, Jean; Cavarec, Francois; Lenclos, Jean-Francois; and Paris, Marc, 4,590,797, Cl. 73-295.000.
Parker Pen Company, The: *See*—
Snyder, James R., 4,591,418, Cl. 204-192.00P.
Parkhurst, Ross A.; and Wedel, John O. Monopulse receiver for a four arm log spiral antenna. 4,591,862, Cl. 343-427.000.
Paston, Alan J.: *See*—
Wieland, Rolf H.; Brodbeck, Howard D.; Paston, Alan J.; and Maucere, Casper C., 4,590,656, Cl. 29-450.000.
Pasztor, Karoly: *See*—
Kovacs, Antal; Erdei, Janos; Kovats, Karoly; Polya, Laszlo ; Pasztor, Karoly; Nagy, Janos; Pepo , Pal; Pepo , Peter; Kiss, Gyorgy; and Kajati, Istvan, 4,591,379, Cl. 71-94.000.
Patsiokas, Stelios J., to Motorola, Inc. Low profile antenna suitable for use with two-way portable transceivers. 4,591,863, Cl. 343-702.000.
Paukovits, Edward J., Jr.: *See*—
Dornes, Bryan J.; Kautz, Jon F.; Paukovits, Edward J., Jr.; Spong, Richard V.; Talarico, Robert J.; and Prescott, Harry G., 4,590,673, Cl. 29-845.000.
Paul, Francois; Monsan, Pierre; and Auriol, Daniel, to Societe Nationale Elf Aquitaine. Process for the purification of dextran-sucrase. 4,591,563, Cl. 435-193.000.
Paul Voss GmbH u. Co.: *See*—
Hesener, Karl, 4,590,642, Cl. 16-241.000.
Paull, Mike M.; Smith, Jerry D.; and Schoenberg, Kathleen D., to Physio-Control Corporation. System for providing power to portable defibrillator. 4,590,943, Cl. 128-419.00D.
Paulson, Wayne M.; and Hughes, David W., to Motorola, Inc. Chromium-silicon-nitrogen thin film resistor and apparatus. 4,591,821, Cl. 338-308.000.
Pawloski, Gayle A., to United States of America, Energy. Quantitative determination of mineral composition by powder X-ray diffraction. 4,592,082, Cl. 378-075.000.
Payne, Frank, to Robertshaw Controls Company. Method of making an electrical switch. 4,590,670, Cl. 29-622.000.

Payrhammer, Bernd: *See—*
Heidrich, Gunter; and Payrhammer, Bernd, 4,591,083, Cl. 226-91.000.

Peachee, C. Theodore, Jr., to Emerson Electric Co. Method of and apparatus for assembling dynamoelectric machine. 4,590,668, Cl. 29-596.000.

Pearsall, Jeannine A., to Aremco Products, Inc. Die material and method of using same. 4,591,385, Cl. 106-38.300.

Peebles, Leighton H., Jr., to United States of America, Navy. Adhesive repair patch. 4,591,511, Cl. 427-142.000.

Pek, Johan J. B.; and Schuurmans, Hubertus J. A., to Shell Oil Company. Horizontal gas/liquid separator. 4,591,367, Cl. 55-344.000.

Pelc, Norbert J.: *See—*
Glover, Gary H.; and Pelc, Norbert J., 4,591,789, Cl. 324-307.000.

Pelfrey, Keith A., to Black & Decker Inc. Magnetic base machine tool. 4,591,301, Cl. 408-76.000.

Pellon Corporation: *See—*
Grant, Paul; and Petkiewicz, Chester, 4,591,526, Cl. 428-198.000.

Penniman, Richard E.: *See—*
Hensel, John C.; and Penniman, Richard E., 4,591,188, Cl. 282-29.00B.

Pennoni, Giovanni, to Agence Spatiale Europeenne. Master clock generator for telecommunications system. 4,591,730, Cl. 370-104.000.

Penobscot Shoe Company: *See—*
Pfander, Wilhelm, 4,590,690, Cl. 36-18.000.

Pepo , Pal: *See—*
Kovacs, Antal; Erdei, Janos; Kovats, Karoly; Polya, Laszlo ; Pasztor, Karoly; Nagy, Janos; Pepo , Pal; Pepo , Peter; Kiss, Gyorgy; and Kajati, Istvan, 4,591,379, Cl. 71-94.000.

Pepo , Peter: *See—*
Kovacs, Antal; Erdei, Janos; Kovats, Karoly; Polya, Laszlo ; Pasztor, Karoly; Nagy, Janos; Pepo , Pal; Pepo , Peter; Kiss, Gyorgy; and Kajati, Istvan, 4,591,379, Cl. 71-94.000.

Perez, Victor: *See—*
Van Exel, Gary A.; Perez, Victor; and Marmol, Alfredo B., 4,591,192, Cl. 285-83.000.

Perigard, Raymond G.: *See—*
Chiang, Robert L.; Perigard, Raymond G.; and Rabo, Jule A., 4,591,576, Cl. 502-65.000.

Perimed KB: *See—*
Nilsson, Gert, 4,590,948, Cl. 128-666.000.

Perlini, Roberto. Oleodynamic steering control device. 4,591,177, Cl. 280-91.000.

Persson, Jan E. Coupling between a drill bit and a drill shaft. 4,591,010, Cl. 175-320.000.

Pertsev, Leonid P.: *See—*
Pryadkin, Pavel P.; Pertsev, Leonid P.; Ziborov, Viktor S.; Pichakhchi, Alexandr F.; Malyshkin, Alexandr A.; and Onufriev, Vladislav N., 4,591,435, Cl. 210-230.000.

Peschel, Rudolf: *See—*
Tellert, Rudy; and Peschel, Rudolf, 4,591,034, Cl. 192-3.580.

Petersen, William H.: *See—*
Stevens, James W.; and Petersen, William H., 4,591,292, Cl. 405-169.000.

Peterson, Charles A., to Hamon-Sobelco. Fire control system for a gas and liquid contact apparatus. 4,591,462, Cl. 261-108.000.

Peterson, Ray D., to Westinghouse Electric Corp. Multistage flash evaporator providing isolation of impure stage distillate flows from the main duct distillate flow. 4,591,413, Cl. 202-173.000.

Peterson, Steven H.; Berg, Bernard J.; and Bowden, David R., to Foresight Enterprises Inc. Method of interrelating a master computer with a peripheral device. 4,591,978, Cl. 364-200.000.

Petkiewicz, Chester: *See—*
Grant, Paul; and Petkiewicz, Chester, 4,591,526, Cl. 428-198.000.

Petroff, Pierre M.: *See—*
Gossard, Arthur C.; and Petroff, Pierre M., 4,591,889, Cl. 357-4.000.

Pettersen, Frederick A.: *See—*
Krug, Russell R.; and Pettersen, Frederick A., 4,591,427, Cl. 208-161.000.

Pevnev, Anatoly A.: *See—*
Shaginian, Albert S.; Pevnev, Anatoly A.; Asan-Dzhalalov, Alexei G.; Androsenko, Alexandr P.; Palkin, Leonid N.; and Klimovich, Elena I., 4,591,007, Cl. 175-85.000.

Pfaff Industriemaschinen GmbH: *See—*
Ulmen, Mathias, 4,590,873, Cl. 112-121.140.

Pfander, Wilhelm, to Penobscot Shoe Company. Article of footwear and method of making same. 4,590,690, Cl. 36-18.000.

Pfeiffer, Eberhard: *See—*
Conrad, Hans-Jurgen; and Pfeiffer, Eberhard, 4,591,339, Cl. 432-205.000.

Pfeiffer, Peter: *See—*
Gallitzendoerfer, Joseph; Pfeiffer, Peter; Tomforde, Johann; and Hellhake, Ferdinand, 4,591,204, Cl. 296-202.000.

Pfeifle, Helmut: *See—*
Hofmann, Eberhard; Pfeifle, Helmut; Schwartz, Reinhard; and Tschoeke, Helmut, 4,590,903, Cl. 123-300.000.

Pfizer Inc.: *See—*
Barth, Wayne E., 4,591,459, Cl. 260-245.20R.
Larson, David L., 4,591,595, Cl. 514-367.000.

Phaal, Cornelius. Abrasive materials. 4,591,364, Cl. 51-309.000.

Pharmacia AB: *See—*
Agback, Karl H., 4,591,584, Cl. 514-160.000.
Ahrgren, Leif G.; and de Belder, Anthony N., 4,591,638, Cl. 536-51.000.

Philipp, Hans-Werner: *See—*
El-Ghatta, Hussain; Philipp, Hans-Werner; Sailer, Richard; and Domeisen, Bruno, 4,591,629, Cl. 528-308.200.

Philipp Kreiss GmbH & Co. Truma-Geratebau: *See—*
Mossbach, Wilhelm, 4,590,917, Cl. 126-90.00R.

Phillips, John A., to Zoological Society of San Diego. Heated bed module for animals. 4,591,694, Cl. 219-217.000.

Phillips Petroleum Co.: *See—*
Horton, Robert L., 4,591,490, Cl. 423-210.000.
Norton, Jerry J., 4,592,077, Cl. 375-110.000.
Yudovich, Amos; and Hays, George E., 4,591,362, Cl. 48-197.00R.

Photon Sources, Inc.: *See—*
Accetta, Joseph S.; Galan, Louis; Hamilton, Patrick D.; and Amick, James L., 4,592,063, Cl. 372-58.000.

Physio-Control Corporation: *See—*
Paull, Mike M.; Smith, Jerry D.; and Schoenberg, Kathleen D., 4,590,943, Cl. 128-419.00D.

Piasecki Aircraft Corporation: *See—*
Piasecki, Frank N.; and Meyers, Donald N., 4,591,112, Cl. 244-26.000.

Piasecki, Frank N.; and Meyers, Donald N., to Piasecki Aircraft Corporation. Vectored thrust airship. 4,591,112, Cl. 244-26.000.

Piatt, Michael J., to Eastman Kodak Company. Ink jet printing apparatus having improved home station diagnostic system. 4,591,874, Cl. 346-75.000.

Piatt, Michael J.: *See—*
Braun, Hilarion; Brown, Mark E.; and Piatt, Michael J., 4,591,870, Cl. 346-1.100.
Katerberg, James A.; Kopp, Gregory M.; and Piatt, Michael J., 4,591,869, Cl. 346-1.100.
McCann, James D.; Piatt, Michael J.; and Williams, Theodore F., 4,591,873, Cl. 346-75.000.

Pichakhchi, Alexandr F.: *See—*
Pryadkin, Pavel P.; Pertsev, Leonid P.; Ziborov, Viktor S.; Pichakhchi, Alexandr F.; Malyshkin, Alexandr A.; and Onufriev, Vladislav N., 4,591,435, Cl. 210-230.000.

Pickens, Arbria E. Doll/blanket. 4,590,633, Cl. 5-482.000.

Picker International Limited: *See—*
Butson, Peter C., 4,591,818, Cl. 335-299.000.

Pigmans, Wilhelmus A. M. Sun bed with improved radiant performances. 4,590,940, Cl. 128-376.000.

Pike, Carl A. Companion warmer. 4,591,693, Cl. 219-217.000.

Pike, John V.: *See—*
Bradshaw, Thomas H.; Golledge, Ian; and Pike, John V., 4,591,123, Cl. 248-349.000.
Bryant-Jeffries, Keith C.; Golledge, Ian; Pike, John V.; and Vaughan, Eric V., 4,591,120, Cl. 248-179.000.

Pinede, Edouard; and Faublas, Serge, to PKS/Communications, Inc. Telephone having built-in test capability for use in key telephone system. 4,591,671, Cl. 179-175.20R.

'Pininfarina S.p.A.: *See—*
Piragino, Alessandro, 4,591,160, Cl. 273-167.00R.

Pinnekamp, Friedrich, to BBC Brown, Boveri & Co., Ltd. Isolating switch. 4,591,680, Cl. 200-146.00R.

Pioneer Electronic Corporation: *See—*
Kato, Hiroshi; Nakada, Hitoshi; Nishiwaki, Isao; Teramoto, Toshio; Yagii, Keikichi; and Niinomi, Masahiro, 4,591,672, Cl. 179-115.5VC.

Piragino, Alessandro, to 'Pininfarina S.p.A. Golf club head. 4,591,160, Cl. 273-167.00R.

Pisella, Christian: *See—*
Fedeli, Jean M.; Jouve, Hubert; Magnin, Joel; and Pisella, Christian, 4,592,017, Cl. 365-19.000.

Piston, Albert O.: *See—*
Criscimagna, Tony N.; and Piston, Albert O., 4,591,847, Cl. 340-776.000.

Pittalis, Francesco: *See—*
Marconi, Walter; Bartoli, Francesco; Morisi, Franco; and Pittalis, Francesco, 4,591,596, Cl. 514-375.000.

PKS/Communications, Inc.: *See—*
Pinede, Edouard; and Faublas, Serge, 4,591,671, Cl. 179-175.20R.

Plannja AB: *See—*
Stromberg, Jan, 4,590,728, Cl. 52-410.000.

Plaschke, Herbert: *See—*
Hosel, Peter; and Plaschke, Herbert, 4,590,738, Cl. 53-266.00R.

Plowman, John S., to Kinpar Pty. Ltd. Protective device for panes of windows and glass doors. 4,590,706, Cl. 49-57.000.

Pluciniczak, Hans-Friedrich: *See—*
Behringer, Jurgen; Pluciniczak, Hans-Friedrich; Syllwasschy, Wolfgang; and Loley, Franz, 4,591,529, Cl. 428-252.000.

Pohl, Winfried, to Robert Bosch GmbH. Method and circuit apparatus for special-effect television picture transitions in which a picture comes on by growing in size or fades away by diminishing in size. 4,591,913, Cl. 358-183.000.

Pohndorf, Peter J., to Cordis Corporation. Neural stimulating lead with stabilizing mechanism and method for using same. 4,590,949, Cl. 128-785.000.

Polaris Home Systems, Inc.: *See—*
Snyder, Irving F.; Vork, William D.; and Itzin, Michael, 4,591,096, Cl. 239-216.000.

Polaroid Corporation: *See—*
Foley, James W., 4,591,628, Cl. 548-146.000.
Grabel, Vernon, 4,591,997, Cl. 364-519.000.
Mason, Paul B.; and Morse, John B., 4,591,255, Cl. 354-303.000.
Meneghini, Frank A.; and Palumbo, Paul S., 4,591,646, Cl. 548-146.000.

Racich, James L.; Schuler, Norman W.; and Trapani, Giorgio B., 4,591,512, Cl. 427-163.000.

Polya, Laszlo : *See*—
Kovacs, Antal; Erdei, Janos; Kovats, Karoly; Polya, Laszlo ; Pasztor, Karoly; Nagy, Janos; Pepo , Pal; Pepo , Peter; Kiss, Gyorgy; and Kajati, Istvan, 4,591,379, Cl. 71-94.000.

Pontagnier, Henri: *See*—
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; Mosser, Jacqueline; and Pontagnier, Henri, 4,591,600, Cl. 514-456.000.

Popalis, Craig H.: *See*—
Tolino, Ralph W.; Hopkins, Ronald J.; Congleton, Ray L.; and Popalis, Craig H., 4,591,068, Cl. 220-240.000.

Pope, Kenneth E. Submersible pumping unit. 4,591,320, Cl. 417-390.000.

Pope, Woodrow W., to Southwest Pump Company. Capacitance probe for use in a measuring system for location of a liquid level interface. 4,591,946, Cl. 361-284.000.

Poran, Michael; Langner, Carl; and Karolyi, Stephen, to SMS Concast Inc. Dummy bar disconnecting arrangement. 4,590,984, Cl. 164-426.000.

Porter, Christopher H.; and Kuyava, Charles C., to American Medical Systems, Inc. Unitary, inflatable penile prosthesis system. 4,590,927, Cl. 128-79.000.

Pou, Frederick M.; and Straub, Richard L., to Monarch Marking Systems, Inc. Method of printing by sensing variable indicia tag format length. 4,590,859, Cl. 101-426.000.

Povajnuk, Walter. Icemaker. 4,590,774, Cl. 62-347.000.

Power Controls Corporation: *See*—
Larson, Ray E., 4,591,781, Cl. 323-323.000.

Power Science, Inc.: *See*—
Cooper, Edward, 4,591,872, Cl. 346-62.000.

Powley, George S.: *See*—
Steele, James H., Jr.; Heckler, Alan J.; Flowers, James W., Jr.; and Powley, George S., 4,591,395, Cl. 148-12.00D.

PPG Industries, Inc.: *See*—
Schaefer, William L., 4,591,371, Cl. 65-1.000.
Schillinger, William J.; Erikson, J. Alden; Dowbenko, Rostyslaw; and Christenson, Roger M., 4,591,518, Cl. 427-385.500.

Practical Products, Inc.: *See*—
Kidwell, Louis E., Jr., 4,590,931, Cl. 128-162.000.

Prame, Eric S., to International Business Machines Corp. Method and device for addressing a memory. 4,592,013, Cl. 364-900.000.

Prat, Gisele: *See*—
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; Mosser, Jacqueline; and Pontagnier, Henri, 4,591,600, Cl. 514-456.000.

Pratt, John M., to International Computers Limited. Digital display system. 4,591,843, Cl. 340-728.000.

Pratt & Whitney Canada Inc.: *See*—
Blizzard, Cyril A. M., 4,590,759, Cl. 60-39.030.

Precor Incorporated: *See*—
Smith, David B.; and Moore, John M., 4,591,147, Cl. 272-69.000.

Preferred Services, Ltd.: *See*—
DeGregorio, Anthony, 4,590,628, Cl. 4-191.000.

Prentice, John S.; and Uscategui, Gabriel J., to Harris Corporation. Method of fabricating low noise reference diodes and transistors. 4,590,664, Cl. 29-571.000.

Prescott, Everett J., to Everett J. Prescott, Inc. Combination adjustable valve box adapter and replacement for broken valve boxes. 4,591,290, Cl. 404-25.000.

Prescott, Harry G.: *See*—
Dornes, Bryan J.; Kautz, Jon F.; Paukovits, Edward J., Jr.; Spong, Richard V.; Talarico, Robert J.; and Prescott, Harry G., 4,590,673, Cl. 29-845.000.

Pribble, Elvern G. Table attachment for chairs. 4,591,206, Cl. 297-148.000.

Prigent, Jean-Pierre. Recovery of carrier and clock frequencies in a phase or amplitude state modulation and coherent demodulation digital transmission system. 4,592,071, Cl. 375-42.000.

Prince, Alfred M., to New York Blood Center, Inc. Process for inactivating hepatitis B virus. 4,591,505, Cl. 424-101.000.

Prince, Daniel O. Landscaping device. 4,590,705, Cl. 47-25.000.

Printco Industries, Ltd.: *See*—
Schommer, David L.; and LaValliere, Wayne, 4,590,855, Cl. 101-157.000.

Prival, Harri G.: *See*—
Ferris, Fred O., III; and Prival, Harri G., 4,591,973, Cl. 364-200.000.

Procter & Gamble Co., The: *See*—
Pultinas, Edmund P., Jr., 4,591,508, Cl. 426-595.000.
Thompson, Hugh A., 4,591,523, Cl. 428-131.000.

Pronk, Gerrit J., to Shell Oil Company. Continuous process for the catalytic treatment of hydrocarbon oils. 4,591,428, Cl. 208-165.000.

Proulx, Richard W.; and Kent, Stephen J., to Federal Cartridge Corporation. Flash hole closure for primer battery cups. 4,590,840, Cl. 86-10.000.

Prudhomme, Malcolm H. Advanced dual filtering apparatus. 4,591,434, Cl. 210-117.000.

Pryadkin, Pavel P.; Pertsev, Leonid P.; Ziborov, Viktor S.; Pichakhchi, Alexandr F.; Malyshkin, Alexandr A.; and Onufriev, Vladislav N. Filter press. 4,591,435, Cl. 210-230.000.

Przybylinski, Phillip G., to Pullman Standard Inc. Single axle truck suspension for railway flat car. 4,590,864, Cl. 105-199.00S.

Pullman Standard Inc.: *See*—
Przybylinski, Phillip G., 4,590,864, Cl. 105-199.00S.

Pultinas, Edmund P., Jr., to Procter & Gamble Co., The. Coffee product and process. 4,591,508, Cl. 426-595.000.

Q. P. Corporation: *See*—
Akiyama, Hirokazu, 4,591,723, Cl. 250-461.100.

Quackenbush, James E., to Computer Memories, Incorporated. Disk drive head positioner with optimized seek operation. 4,591,933, Cl. 360-78.000.

Quadraruopolo, Andrea: *See*—
Mantellina, Calogero; Trivella, Roberto; and Quadraruopolo, Andrea, 4,592,011, Cl. 364-900.000.

Quinn, Robert E., to Lubrizol Corporation, The. Cross-linkable compositions containing non-Newtonian colloidal disperse systems. 4,591,612, Cl. 524-425.000.

R. R. Donnelley & Sons Company: *See*—
Toste, Edward N., Jr.; and Clifford, Daniel, 4,591,046, Cl. 198-457.000.

Rabo, Jule A.: *See*—
Chiang, Robert L.; Perigard, Raymond G.; and Rabo, Jule A., 4,591,576, Cl. 502-65.000.

Racal Safety Limited: *See*—
O'Connor, Richard K., 4,590,951, Cl. 128-204.230.

Racich, James L.; Schuler, Norman W.; and Trapani, Giorgio B., to Polaroid Corporation. Method of making light polarizer. 4,591,512, Cl. 427-163.000.

Radmer, Alfred: *See*—
Nussel, Lothar; and Radmer, Alfred, 4,591,775, Cl. 318-711.000.

Rain Bird Consumer Products Mfg. Corp.: *See*—
Van Exel, Gary A.; Perez, Victor; and Marmol, Alfredo B., 4,591,192, Cl. 285-83.000.

Ram Elettronica di Baclagis Luca & C. S.n.c.: *See*—
Baclagis, Luca, 4,590,874, Cl. 112-121.260.

Ranalli, Domenico, to Optikon Oftalmologia, S.p.A. Control system for intraocular surgical device. 4,590,935, Cl. 128-305.000.

Ranchon, Marcel: *See*—
Divoux, Michel; Constant, Bernard; and Ranchon, Marcel, 4,591,142, Cl. 271-196.000.

Randen, Ilkka, to Lassila & Tikanoja Oy. Lifting wedge. 4,591,200, Cl. 294-96.000.

Randles, Arthur E. Carton closing machine. 4,590,745, Cl. 53-541.000.

Rapoport, Uri, to LandAire DynaBrake, Inc. Braking system. 4,591,213, Cl. 303-93.000.

Rast, Jurgen: *See*—
Hannig, Robert; and Rast, Jurgen, 4,590,758, Cl. 59-85.000.

Rauch, Werner; Schmitt, Guenter; and Tschunt, Edgar, to Siemens Aktiengesellschaft. Computer tomograph. 4,592,080, Cl. 378-19.000.

Raush, Russell G., to RCA Corporation. Seal arrangement for retaining a liquid level above a strip passing through a chamber. 4,591,169, Cl. 277-135.000.

Ravasy, Bernard: *See*—
Aubert, Jean P.; Bracon, Roland; and Ravasy, Bernard, 4,590,752, Cl. 57-9.000.

Ray, Tushar K., to Research Foundation of State University of New York. Method and ingestible formulation for inhibiting the secretion of stomach acid. 4,591,605, Cl. 514-579.000.

Raychem Corporation: *See*—
Sopory, Umesh K., 4,591,700, Cl. 219-505.000.

Rayovac Corporation: *See*—
Oltman, John E.; Carpenter, Denis D.; and Dopp, Robert B., 4,591,539, Cl. 429-27.000.

Raytheon Company: *See*—
Campbell, Richard A., 4,591,859, Cl. 343-5.0AF.

RCA Corporation: *See*—
Andrevski, Zygmunt M., 4,591,901, Cl. 358-50.000.
Belotserkovsky, Isaac M.; and Hollinden, David E., 4,591,912, Cl. 358-166.000.
Fling, Russell T.; and Willis, Donald H., 4,591,832, Cl. 340-347.0DA.
Heeb, Egon J.; Knop, Karl H.; and Morf, Rudolf H., 4,591,900, Cl. 358-44.000.
Nero, Leroy W., 4,591,819, Cl. 336-178.000.
Raush, Russell G., 4,591,169, Cl. 277-135.000.
Starski, Wojciech, 4,590,660, Cl. 29-566.300.

Reber, Reinhold F. Link belt for an infinitely variable transmission including cone disks looped by a flexible belt. 4,591,353, Cl. 474-245.000.

Redding, Robert J. Line powered modem. 4,592,069, Cl. 375-8.000.

Reed, Charles J.; and Heit, Henry R., to Ametek, Inc. Self calibrating pressure transducer. 4,590,791, Cl. 73-4.00R.

Reed, Lowell M., to Parco Mast and Substructure, Inc. Telescoping derrick. 4,590,720, Cl. 52-121.000.

Reed, Thomas A.: *See*—
Hunkin, Geoffrey G.; and Reed, Thomas A., 4,590,810, Cl. 73-864.630.

Reeve, Michael J.: *See*—
Darlington, John; and Reeve, Michael J., 4,591,971, Cl. 364-200.000.

Regan, Robert J.; Butler, Scott J.; and Ben-Aharon, Zvi, to GTE Laboratories Incorporated. High frequency power source. 4,591,809, Cl. 331-117.00R.

Reichmann, Richard H.: *See—*
Campbell, Jay E.; Reichmann, Richard H.; and Li, Lehmann K., 4,591,086, Cl. 227-19.000.

Reimann, William G., to Hughes Aircraft Company. Method for forming a high density printed wiring board. 4,591,411, Cl. 156-634.000.

Reimer, William A., to GTE Communication Systems Corporation. Low insertion force connection arrangement. 4,591,217, Cl. 339-17.0LM.

Reimer, William A., to GTE Communication Systems Corporation. Low insertion force connection arrangement. 4,591,218, Cl. 339-17.0LM.

Reimer, William A., to GTE Communication Systems Corporation. Low insertion force connection arrangement. 4,591,219, Cl. 339-17.0LM.

Reliance Products Ltd.: *See—*
Berney, Sheldon, 4,591,126, Cl. 248-524.000.

Remy, David C., to Merck & Co., Inc. Cyclopropyl pyridine compounds useful as calcium channel blockers. 4,591,587, Cl. 514-222.000.

Renner, Udo: *See—*
Guenther, Hans-Jurgen; Nauck, Joachim; Renner, Udo; and Fehse, Wigbert, 4,591,116, Cl. 244-168.000.

Repetto, Eugenio; Marafini, Fabrizio; and Tesini, Francesco, to Italimpianti-Societa Italiana Impianti P.A. Conductive bottom for direct current electric arc furnaces. 4,592,066, Cl. 373-72.000.

Rescalli, Carlo: *See—*
Gazzi, Luigi; D'Ambra, Roberto; Di Cintio, Roberto; Rescalli, Carlo; and Vetere, Alessandro, 4,591,370, Cl. 62-17.000.

Research Corporation: *See—*
Cates, Lindley A., 4,591,582, Cl. 514-114.000.

Research Foundation of State University of New York: *See—*
Ray, Tushar K., 4,591,605, Cl. 514-579.000.

Retotar, Daniel D., to AT&T Bell Laboratories. Technique for reducing line current harmonics at input to power supply acting as nonlinear load. 4,591,963, Cl. 363-17.000.

Rettew, Robert A. Apparatus and method for servicing a nuclear reactor system. 4,591,477, Cl. 376-204.000.

Reuter, Robert E.; and Markus, Isidoro N., to Knoll International, Inc. Cabinet closure assembly. 4,591,214, Cl. 312-110.000.

Reuter, Wolfgang; and Hartmann, Manfred, to Leybold-Heraeus GmbH. Precision vacuum melting and casting furnace with a melting chamber and a casting chamber. 4,590,983, Cl. 164-258.000.

Reyes, Tony, Jr. Marble tossing game. 4,591,163, Cl. 273-401.000.

Reynolds Metals Company: *See—*
Moeller, Jerris C.; Stewart, Douglas V.; and Tabereaux, Alton T., 4,591,419, Cl. 204-243.00R.

Rhein-Chemie Rheinau GmbH: *See—*
Hugo, Peter; and Noack, Rainer, 4,591,645, Cl. 548-142.000.

Rheinmetall GmbH: *See—*
Lipp, Herbert, 4,591,342, Cl. 434-18.000.

Rhoads, Gerald A. Draw works traveling block motion control apparatus. 4,591,131, Cl. 254-269.000.

Ricoh Company, Ltd.: *See—*
Isayama, Takuro, 4,591,883, Cl. 346-140.00R.
Koide, Hiroshi, 4,591,767, Cl. 318-314.000.
Oseto, Seiichi; Fujimura, Itaru; and Nakamura, Hitoshi, 4,591,262, Cl. 355-14.0CH.

Ridenour, Ralph G. Apparatus for producing aerated water. 4,591,098, Cl. 239-288.300.

Riekmann, Dieter: *See—*
Killat, Ulrich; Riekmann, Dieter; and Stecher, Rolf, 4,592,049, Cl. 370-87.000.

Riker Labcratories, Inc.: *See—*
Wade, James J., 4,591,588, Cl. 514-222.000.

Ritchie, John A.: *See—*
Katsman, Ilya; Ritchie, John A.; Burmenko, Mark; and Zaltsman, Vladimir, 4,590,709, Cl. 49-396.000.

Rivaud, Jose M. C. Pressure earring. 4,590,775, Cl. 63-14.00G.

Rivers, William B. Fishing pole alarm system. 4,590,701, Cl. 43-17.000.

Robbins, Howard. Merchandising and display device. 4,591,215, Cl. 312-234.300.

Robert Alameda: *See—*
Schjeldahl, Gilmore T., 4,590,747, Cl. 53-562.000.

Robert Bosch GmbH: *See—*
Conrad, Hans-Jurgen; and Pfeiffer, Eberhard, 4,591,339, Cl. 432-205.000.
Faupel, Werner; and Hofer, Gerald, 4,590,913, Cl. 123-502.000.
Hofmann, Eberhard; Pfeifle, Helmut; Schwartz, Reinhard; and Tschoeke, Helmut, 4,590,903, Cl. 123-300.000.
Pohl, Winfried, 4,591,913, Cl. 358-183.000.
Wannenwetsch, Peter, 4,590,904, Cl. 123-300.000.
Zimmermann, Klaus-Dieter; and Hofbauer, Peter, 4,590,902, Cl. 123-260.000.

Robert Finke Kommanditgesellschaft: *See—*
Finke, Robert-Gunter; Schumacher, Clemens; Kolb, Albert; Lautenschlager, Horst; and Konetzka, Jurgen, 4,591,050, Cl. 206-222.000.

Roberts, Joseph D. Sharpener for phillipshead screwdrivers. 4,590,651, Cl. 29-80.000.

Robertshaw Controls Company: *See—*
Payne, Frank, 4,590,670, Cl. 29-622.000.

Robertson, David W., to Eli Lilly and Company. Pyridazinone derivatives as inotropic agents. 4,591,591, Cl. 514-254.000.

Robertson, Frank C.: *See—*
Fogg, Sidney G.; and Robertson, Frank C., 4,591,620, Cl. 525-328.800.

Robinson, Alan W., to Roundel Electronics Limited. Touch control identification system with portable encoder. 4,591,854, Cl. 340-825.310.

Robinson, J. Stephen: *See—*
Schneller, Joseph W.; Kossuth, Donald A.; and Robinson, J. Stephen, 4,590,733, Cl. 52-741.000.

Robinson, Kay L.: *See—*
Atkinson, Alan W.; Dearden, Katryna J.; Doyle, Christina; Lancaster, Janet M.; Marshall, Kenneth H.; and Robinson, Kay L., 4,591,166, Cl. 277-1.000.

Robinson, William C.: *See—*
Bradshaw, David C.; Robinson, William C.; and Rossi, James R., 4,592,031, Cl. 367-45.000.

Robotic Vision Systems, Inc.: *See—*
Hecker, Joel; and Stern, Howard, 4,591,253, Cl. 354-227.100.

Rockenschaub, Walter: *See—*
Smejkal, Hellmuth; Rockenschaub, Walter; and Fohler, Johann, 4,591,134, Cl. 266-135.000.

Rockwell International Corporation: *See—*
Wagner, William R.; and Feight, Robert A., 4,591,534, Cl. 428-593.000.
Whikehart, J. William, 4,592,074, Cl. 375-75.000.

Rockwell-Rimoldi S.p.A.: *See—*
Sanvito, Roberto; Fietta, Emilio; and Della Torre, Giancarlo, 4,590,875, Cl. 112-168.000.

Rodocker, Frank A., to Ex-Cell-O Corporation. Container sterilization apparatus and method. 4,590,740, Cl. 53-426.000.

Rohde, Kenneth R.: *See—*
Gardner, William N.; and Rohde, Kenneth R., 4,590,963, Cl. 137-554.000.

Rohr, Martin; and Flynn, Cormack, to Givaudan Corporation. Alkyl α-campholenates and dihydro derivatives thereof as tobacco flavorants. 4,590,953, Cl. 131-276.000.

Roldan, Frank. Electrical connector receptacle. 4,591,230, Cl. 339-258.00R.

Rollmann, L. Deane: *See—*
Hoskin, Dennis H.; Rollmann, L. Deane; Shoemaker, Gerald L.; and Schmitt, Kirk D., 4,590,996, Cl. 166-244.100.

Rome Industries, Inc.: *See—*
Broome, Mark W.; and McKemie, George R., 4,591,003, Cl. 172-597.000.

Rorije, Gerhardus J.: *See—*
Bakker, Gijsbertus; and Rorije, Gerhardus J., 4,591,757, Cl. 313-461.000.

Rose, Jochen; and Zebisch, Manfred W., to International Standard Electric Corporation. Pulse generator. 4,591,674, Cl. 200-11.0DA.

Rosenberg, David, to Vynalam, Ltd. Air-trapping insoles. 4,590,689, Cl. 36-3.00B.

Rosenthal, Dieter: *See—*
Klockner, Jurgen; and Rosenthal, Dieter, 4,590,778, Cl. 72-19.000.

Rosenthal, Henry; and Kronhaus, Howard E., to HaDiHo. Apparatus and method for roll wrapping articles. 4,590,737, Cl. 53-211.000.

Rosky, Leon; Anslow, Gabriel T.; Spaniola, Daniel F.; and Weintraub, Marvin H., to Optimizer, Limited. Method for increasing fuel efficiency. 4,590,914, Cl. 123-557.000.

Ross, Dennis: *See—*
Tucker, Hartwell F.; Tucker, Jeffrey R.; Ross, Dennis; and Knirck, Jeffrey G., 4,590,635, Cl. 15-50.00R.

Ross, Glenn D.: *See—*
Collins, Thomas D.; and Ross, Glenn D., 4,591,090, Cl. 229-15.000.

Rossi, James R.: *See—*
Bradshaw, David C.; Robinson, William C.; and Rossi, James R., 4,592,031, Cl. 367-45.000.

Roth, Reinhold C. Method & apparatus for uniformly drying paper webs and the like. 4,590,685, Cl. 34-31.000.

Roth, Richard W.: *See—*
Sherwood, Michael D.; Gregor, William T.; Snyder, Kenneth D.; El-Kilani, Saddah; and Roth, Richard W., 4,591,704, Cl. 235-380.000.

Roundel Electronics Limited: *See—*
Robinson, Alan W., 4,591,854, Cl. 340-825.310.

Rousseau, Jean-Paul: *See—*
Beranger, Herve ; Brunin, Armand; and Rousseau, Jean-Paul, 4,592,023, Cl. 365-189.000.

Roussel Uclaf: *See—*
Gasc, Jean-Claude; Humbert, Daniel; and Hunt, Peter F., 4,591,589, Cl. 514-248.000.
Jouquey, Alain; and Hunt, Peter F., 4,591,461, Cl. 558-429.000.

Rowlands, Ronald H.: *See—*
Bozarth, Theodore B., Jr.; Olsen, Arthur M.; and Rowlands, Ronald H., 4,592,002, Cl. 364-571.000.

Royer, Clady J., II. Saddle stirrup setting device. 4,590,750, Cl. 54-46.000.

RTE Corporation: *See—*
Mikulecky, Harvey W.; and Knapp, Todd K., 4,591,816, Cl. 335-6.000.
Yamat, Miguel B.; and Link, Edwin A., 4,591,679, Cl. 200-144.00B.

Ruck, George T.: *See—*
Birchmeier, John R.; Ruck, George T.; Thompson, Neil G.; and Barlo, Thomas J., 4,591,792, Cl. 324-425.000.

Ruckgaber, Gary M., to Standard Oil Company (Indiana). Methods of processing geophysical data and displays of geophysical data. 4,592,032, Cl. 367-73.000.

Rudy, Richard M., Jr.: *See*—
Koos, William M., Jr.; Geis, Timothy R.; and Rudy, Richard M., Jr., 4,591,846, Cl. 340-748.000.

Ruger, William B.; and Melcher, Roy L., to Sturm, Ruger & Company, Inc. Ambidextrous safety mechanism. 4,590,697, Cl. 42-70.00F.

Rugg, Barry; and Stanton, Robert, to New York University. Continuous apparatus for chemical conversion of materials. 4,591,386, Cl. 127-1.000.

Ruhrgas Aktiengesellschaft: *See*—
Gillhaus, Horst, 4,591,337, Cl. 432-138.000.

Ruiz, Antonio R.; and Simpson, William M. Static three hinged arch building structure. 4,590,717, Cl. 52-64.000.

Rusch, Reinhart: *See*—
Krahmer, Hansjorg; Rusch, Reinhart; Kruger, Hans-Rudolf; and Sjut, Volkert, 4,591,376, Cl. 71-90.000.

Ruszczyk, Vicki V.; and Ting, Youn H., to Texas Instruments Incorporated. Thermostatic electric switch and thermal biasing assembly therefor. 4,591,820, Cl. 337-107.000.

Rutsche, Wendolin; and Langenegger, Urs, to Embru-Werke, Mantel & CIA. Furniture piece with a table top whose height and/or angle of tilt can be adjusted. 4,590,865, Cl. 108-1.000.

Sabbah, Mordache: *See*—
Nassau, Lewis; and Sabbah, Mordache, 4,590,723, Cl. 52-211.000.

Sabrie , Jean-Louis, to Alsthom-Atlantique; and Electricite de France. Synchronous machine with a superconducting voltage and speed regulator. 4,591,776, Cl. 318-717.000.

Sachs, Isaac. Grounding strap. 4,591,229, Cl. 339-251.000.

SACHS-Systemtechnik GmbH: *See*—
Lutz, Dieter; and Thieler, Wolfgang, 4,591,039, Cl. 192-91.00A.
Tellert, Rudy; and Peschel, Rudolf, 4,591,034, Cl. 192-3.580.

Sachse, Wolfgang H.; and Sancar, Selcuk, to Cornell Research Foundation, Inc. Acoustic emission source location on plate-like structures using a small array of transducers. 4,592,034, Cl. 367-127.000.

Saeki, Yoshifumi: *See*—
Iwamoto, Shigeyoshi; Saeki, Yoshifumi; Kuribayashi, Takashi; Ishitsuka, Shinichiro; and Ogino, Nobukuni, 4,591,951, Cl. 361-417.000.

Safeguard Business Systems, Inc.: *See*—
Hensel, John C.; and Penniman, Richard E., 4,591,188, Cl. 282-29.00B.

Sahai, Yogeshwar; and Clumpner, Joseph A., to Swiss Aluminium Ltd. Pusher furnace. 4,591,338, Cl. 432-148.000.

Sahashi, Masashi: *See*—
Kobayashi, Tadahiko; Sahashi, Masashi; Inomata, Koichiro; Domon, Tomokazu; and Fukuda, Hironori, 4,590,807, Cl. 73-862.360.

Saikawa, Isamu: *See*—
Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi; Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, 4,591,558, Cl. 435-68.000.

Sailer, Richard: *See*—
El-Ghatta, Hussain; Philipp, Hans-Werner; Sailer, Richard; and Domeisen, Bruno, 4,591,629, Cl. 528-308.200.

Sainen, Tsutomu: *See*—
Sugita, Katsuhiko; and Sainen, Tsutomu, 4,590,972, Cl. 139-435.000.

Sainsbury, Garrett M. Focussing solar collector. 4,590,920, Cl. 126-425.000.

Saito, Kazuo: *See*—
Miyata, Seizo; Tasaka, Shigeru; Saito, Kazuo; Seo, Iwao; Nakajima, Kenji; and Kosaka, Takeshi, 4,591,465, Cl. 264-22.000.

Saito, Kiyotaka: *See*—
Kitsunai, Tomoyuki; Saito, Kiyotaka; and Hori, Shozo, 4,591,619, Cl. 525-285.000.

Saito, Susumu: *See*—
Owaki, Isao; and Saito, Susumu, 4,591,927, Cl. 360-15.000.

Saito, Tadahiro: *See*—
Ito, Akihiko; and Saito, Tadahiro, 4,591,895, Cl. 357-42.000.

Saito, Yoshiaki: *See*—
Nishimatsu, Masaharu; Ide, Toshiaki; Kubota, Yuichi; Saito, Yoshiaki; and Arioka, Hiroyuki, 4,591,528, Cl. 428-212.000.

Saitoh, Shouji: *See*—
Sasaki, Akira; Mashiko, Kazuyuki; Saitoh, Shouji; and Hakoyama, Akiyoshi, 4,591,878, Cl. 346-76.0PH.

Sakai, Hiro: *See*—
Kawamura, Toshihide; Kashiwabara, Hoichiro; Waki, Osamu; and Sakai, Hiro, 4,591,954, Cl. 362-61.000.

Sakai, Hiroshi: *See*—
Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi; Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, 4,591,558, Cl. 435-68.000.

Sakai, Kikuo; Onishi, Yoshiaki, deceased; and by Onishi, Junko, administratrix, to Hitachi, Ltd.; and Hitachi Microcomputer Engineering Ltd. Semiconductor ROM. 4,592,024, Cl. 365-200.000.

Sakai, Noriyuki: *See*—
Morishita, Tsuyoshi; Osaki, Sigemi; Sakai, Noriyuki; and Kawado, Yasuhumi, 4,591,480, Cl. 419-9.000.

Sakai, Utaro, to Maruchi Koken Kabushiki Kaisha. Method and apparatus for separating oil from water. 4,591,441, Cl. 210-649.000.

Sakakibara, Yasuyuki: *See*—
Yoshinaga, Toru; Sakakibara, Yasuyuki; Abe, Seiko; Watanabe, Kazuhide; and Natsuyama, Yukihiro, 4,590,908, Cl. 123-357.000.

Sakata, Tsunetaka: *See*—
Kawata, Yoshihiro; Sakata, Tsunetaka; Matsufuji, Teruo; Inomata, Tetsuro; and Miyashita, Hiroyuki, 4,592,046, Cl. 370-58.000.

Sakoe, Hiroaki: *See*—
Watari, Masao; and Sakoe, Hiroaki, 4,592,086, Cl. 381-43.000.

Sakowski, Carol G. Method of relief of pain based on the use of a non-invasive pressure-application device which produces a highly-localized self-induced massage. 4,590,939, Cl. 128-329.00A.

Sakuma, Kuniharu: *See*—
Matsubara, Toru; Iimura, Ikuro; Sakuma, Kuniharu; and Goto, Sumio, 4,590,879, Cl. 112-278.000.

Sakuma, Masashi; Nakagoshi, Kazuo; Shiraishi, Kazuhisa; and Ozaki, Shoji, to Hitachi, Ltd. Waveform equivalent circuit. 4,591,939, Cl. 360-46.000.

Sakurai, Seiya: *See*—
Miyatake, Henry J.; and Sakurai, Seiya, 4,591,313, Cl. 416-155.000.

Sakurai, Takayasu: *See*—
Matsukawa, Naohiro; Isobe, Mitsuo; and Sakurai, Takayasu, 4,592,026, Cl. 365-203.000.

Sakurai, Yasushi: *See*—
Tanaka, Hiroshi; Mitani, Sotozi; and Sakurai, Yasushi, 4,590,783, Cl. 72-384.000.

Salazar, Edward J. Decorative facing. 4,590,726, Cl. 52-314.000.

Saleh, Adel A. M., to AT&T Bell Laboratories. Linear FET power amplifier. 4,591,803, Cl. 330-277.000.

Samis, Philip L. Engraving apparatus. 4,591,304, Cl. 409-92.000.

Samson, Ronald; and Packwood, Russel J., to Samson, Ronald. Remotely controlled toy golfer. 4,591,158, Cl. 273-87.400.

Samsonite Corporation: *See*—
Hughes, Gerry A., 4,591,287, Cl. 403-237.000.

Samuelson, Bruce E., to Minnesota Mining and Manufacturing Company. Tape applicator. 4,591,407, Cl. 156-527.000.

Sancar, Selcuk: *See*—
Sachse, Wolfgang H.; and Sancar, Selcuk, 4,592,034, Cl. 367-127.000.

Sandhaus, Jeffrey. Tamper-evident closure apparatus. 4,591,062, Cl. 215-230.000.

Sandoz Ltd.: *See*—
Greve, Manfred; and Moser, Helmut, 4,591,635, Cl. 534-612.000.

Santarone, Pasquale A. Pitching rubber and home plate construction. 4,591,154, Cl. 273-25.000.

Sanvito, Roberto; Fietta, Emilio; and Della Torre, Giancarlo, to Rockwell-Rimoldi S.p.A. Modular sewing machine. 4,590,875, Cl. 112-168.000.

Sapporo Breweries Limited: *See*—
Yoshigi, Naohiro; Chikano, Takahide; and Mori, Yoshitada, 4,591,561, Cl. 435-101.000.

Sargent, Frank R. Multiple cone type variable power transmission mechanism. 4,590,815, Cl. 74-191.000.

Sartoretto, Paul, to W. A. Cleary Chemical Corporation. Urea-acetaldehyde and urea-acetaldehyde-propionaldehyde solutions. 4,591,375, Cl. 71-28.000.

Saruwatari, Ryoji; and Taniyama, Yoshiharu, to Kabushiki Kaisha Toshiba. Image forming apparatus with variable rotational speed of developers. 4,591,261, Cl. 355-4.000.

Sasa, Nobumasa; Sato, Yuzuru; Ohta, Tatsuo; and Shindo, Masanari, to Konishiroku Photo Industry Co., Ltd. Metal image forming materials with light sensitive resin layer and oblique angle deposited metal underlayer. 4,591,544, Cl. 430-166.000.

Sasaki, Akira; Mashiko, Kazuyuki; Saitoh, Shouji; and Hakoyama, Akiyoshi, to Hitachi, Ltd. Thermal printer. 4,591,878, Cl. 346-76.0PH.

Sasaki, Itsuo: *See*—
Suzuki, Hiroaki; and Sasaki, Itsuo, 4,592,021, Cl. 365-189.000.

Sasaki, Kenichi: *See*—
Sato, Yoshihiro; Sasaki, Kenichi; Miyamoto, Tatsuo; and Tsuzaka, Hideo, 4,591,303, Cl. 408-206.000.

Sasaki, Satoshi: *See*—
Suzuki, Migaku; Kobayashi, Toshio; Sasaki, Satoshi; and Imai, Shigeo, 4,591,513, Cl. 427-200.000.

Sasaki, Shigekuni: *See*—
Maruno, Tooru; Nakamura, Kouzaburou; and Sasaki, Shigekuni, 4,591,627, Cl. 528-103.000.

Sasaki, Toshiki: *See*—
Nakamura, Chiaki; Oe, Kouji; Muta, Tomonobu; and Sasaki, Toshiki, 4,591,545, Cl. 430-284.000.

Sasib S.p.A.: *See*—
Manfredini, Alfonso, 4,590,952, Cl. 131-94.000.

Sasso, Bill J. Continuous feed document carrier. 4,591,146, Cl. 271-275.000.

Satake, Toshimi; Minami, Toshiaki; and Fujimura, Fumio, to Jujo Paper Co., Ltd. Heat-sensitive recording sheet. 4,591,888, Cl. 346-209.000.

Sato, Akihiro; Tachibana, Masami; Shimizu, Hiroshi; and Uwai, Toshihiro, to Chisso Corporation. Solid catalyst component for alpha-olefin polymerization and process for producing same. 4,591,577, Cl. 502-105.000.

Sato, Atsushi; Endo, Keiji; Kawakami, Shigenobu; and Dohi, Hideyuki, to Nippon Petrochemicals Company, Limited. Oil-filled capacitor. 4,591,948, Cl. 361-315.000.

Sato, Bunryo, to Kabushiki Kaisha Ohara Kogaku Garasu Seizosho. Method for molding high-precision glass products. 4,591,373, Cl. 65-29.000.

Sato, Kimiaki: *See*—
Takemae, Yoshihiro; Nakano, Tomio; and Sato, Kimiaki, 4,592,020, Cl. 365-189.000.

Sato, Yoji; and Yamamoto, Keiichi, to Aisan Kogyo Kabushiki Kaisha. Control circuit for an electrically heated bimetal actuated automatic choke valve. 4,591,699, Cl. 219-497.000.

Sato, Yoshihiro; Sasaki, Kenichi; Miyamoto, Tatsuo; and Tsuzaka, Hideo, to Tokyo Shibaura Denki Kabushiki Kaisha; and Toshiba Tungaloy Co., Ltd. Drilling tool. 4,591,303, Cl. 408-206.000.

Sato, Yuzuru: *See*—
Sasa, Nobumasa; Sato, Yuzuru; Ohta, Tatsuo; and Shindo, Masanari, 4,591,544, Cl. 430-166.000.

Sauer, Gerhard: *See*—
Kerb, Ulrich; Sauer, Gerhard; Wiechert, Rudolf; Henderson, David; Nishino, Yukishige; and Beier, Sybille, 4,591,585, Cl. 514-177.000.

Saulson, Stanley H.; Schroeppel, Edward A.; and Tarjan, Peter P., to Cordis Corporation. Cardiac pacer with improved battery system, output circuitry, and emergency operation. 4,590,941, Cl. 128-419.0PG.

Saunders, Frances C.: *See*—
Hughes, Anthony J.; Saunders, Frances C.; and Shanks, Ian A., 4,591,849, Cl. 340-784.000.

Sawada, Kazuo: *See*—
Isobe, Shinichi; and Sawada, Kazuo, 4,591,770, Cl. 318-565.000.

Sawano, Hiroshi, to Konishiroku Photo Industry Co., Ltd. Automatic focusing camera. 4,591,257, Cl. 354-403.000.

Sawazaki, Norikazu: *See*—
Senzaki, Shigeo; Ikeuchi, Jun-ichiro; Matsui, Toshikazu; and Sawazaki, Norikazu, 4,592,041, Cl. 369-126.000.

Saxholm, Rolf. Apparatus and associated methods for use in microbiological, serological, immunological, clinical-chemical and similar laboratory work. 4,591,556, Cl. 435-33.000.

Scapinelli, Bruno, to Microencapsulation S.A. Tablet having the shape of a capsule, process and device for its preparation. 4,591,500, Cl. 424-15.000.

Scartazzini, Riccardo; and Bickel, Hans, to Ciba-Geigy Corporation. Cephem and cepham derivatives. 4,591,642, Cl. 544-16.000.

Schaefer, William L., to PPG Industries, Inc. Glass fiber forming bushing construction. 4,591,371, Cl. 65-1.000.

Schairbaum, Edward C. Work station with underdesk display. 4,590,866, Cl. 108-23.000.

Schauer, Wolfgang: *See*—
Krevet, Berthold; Schauer, Wolfgang; and Wuchner, Fritz, 4,591,509, Cl. 427-62.000.

Schaumann, Peter H. Walker-sailor watercraft. 4,591,343, Cl. 441-76.000.

Schenck, George C.: *See*—
Webber, Douglas G.; and Schenck, George C., 4,591,976, Cl. 364-200.000.

Schenk, Christoph, to Erwin Sick GmbH Optik-Elektronik. Optical fault seeking apparatus for webs. 4,591,726, Cl. 250-572.000.

Scherber, Werner, to Dornier System GmbH. Infrared detection. 4,591,717, Cl. 250-338.000.

Schering Aktiengesellschaft: *See*—
Kerb, Ulrich; Sauer, Gerhard; Wiechert, Rudolf; Henderson, David; Nishino, Yukishige; and Beier, Sybille, 4,591,585, Cl. 514-177.000.
Kerb, Ulrich; Eder, Ulrich; and Krahmer, Hansjorg, 4,591,650, Cl. 549-268.000.
Krahmer, Hansjorg; Rusch, Reinhart; Kruger, Hans-Rudolf; and Sjut, Volkert, 4,591,376, Cl. 71-90.000.

Schetina, Otto: *See*—
Droscher, Bernhard; Schetina, Otto; Wrulich, Herwig; and Zitz, Alfred, 4,591,209, Cl. 299-1.000.

Scheumann, Leonhard: *See*—
Kruger, Tilmann; Arnold, Werner; and Scheumann, Leonhard, 4,591,728, Cl. 307-75.000.

Schiffers, Ulrich: *See*—
Goebel, Konrad; Muller, Rainer; and Schiffers, Ulrich, 4,590,760, Cl. 60-39.120.

Schillinger, William J.; Erikson, J. Alden; Dowbenko, Rostyslaw; and Christenson, Roger M., to PPG Industries, Inc. Acrylic functional urethane alkyd resin coating compositions. 4,591,518, Cl. 427-385.500.

Schjeldahl, Gilmore T., to Robert Alameda. Positive displacement filling machine. 4,590,747, Cl. 53-562.000.

Schliemann, Harald: *See*—
Wissmann, Michael; and Schliemann, Harald, 4,590,896, Cl. 123-73.00R.

Schlossman, Mitchell L. Compressing aid for cosmetic powders. 4,591,502, Cl. 424-63.000.

Schmidek, Reinhard; and Stark, Manfred, to MERO-Raumstruktur GmbH & Co. Joint connection for space framework, made of rods and joint members. 4,591,288, Cl. 403-260.000.

Schmidt, Edi, to SIG Schweizerische Industrie-Gesellschaft. Apparatus for metering bulk material. 4,590,977, Cl. 141-129.000.

Schmidt, George S.: *See*—
Ades, Adrian R.; and Schmidt, George S., 4,590,653, Cl. 29-156.80R.

Schmitt, Eugene W.; and Stoltenberg, Michael R., to Sloan Valve Company. Gladhand with built-in dirt protection plug. 4,590,967, Cl. 137-613.000.

Schmitt, Guenter: *See*—
Rauch, Werner; Schmitt, Guenter; and Tschunt, Edgar, 4,592,080, Cl. 378-19.000.

Schmitt, Kirk D.: *See*—
Hoskin, Dennis H.; Rollmann, L. Deane; Shoemaker, Gerald L.; and Schmitt, Kirk D., 4,590,996, Cl. 166-244.100.

Schmutz, Wolfgang: *See*—
Illig, Egon; Gentischer, Josef; and Schmutz, Wolfgang, 4,591,140, Cl. 271-11.000.

Schneider, George W., Jr.: *See*—
Hicks, Irwin A.; Jacobsen, Robert S.; Kee, David F.; and Schneider, George W., Jr., 4,590,790, Cl. 73-3.000.

Schneider, Karl-Heinz; Paeschke, Otto; Del Fabro, Michael; and Loeser, Norbert, to SKF GmbH. Radial ball-and-socket bearing. 4,591,276, Cl. 384-206.000.

Schneider, Palle: *See*—
Branner-Jorgensen, Sven; Schneider, Palle; and Eigtved, Peter, 4,591,565, Cl. 435-223.000.

Schneller, Joseph W.; Kossuth, Donald A.; and Robinson, J. Stephen, to National Gypsum Company. Curtain wall panel and method. 4,590,733, Cl. 52-741.000.

Schoenberg, Kathleen D.: *See*—
Paull, Mike M.; Smith, Jerry D.; and Schoenberg, Kathleen D., 4,590,943, Cl. 128-419.00D.

Schofield, John, to U.S. Philips Corporation. Surface-propagating acoustic wave device. 4,591,815, Cl. 333-195.000.

Scholes, Gary; and van Helden, Robert, to Shell Oil Company. Arylsulphonyl azetidine compounds used as intermediates. 4,591,457, Cl. 260-239.00A.

Scholz, Heinrich; and Flemming, Gunter, to SMS Concast Inc. Roller guide for continuous casting installation. 4,590,986, Cl. 164-448.000.

Schommer, David L.; and LaValliere, Wayne, to Printco Industries, Ltd. Reverse angle doctor blade assembly with stationary end seal. 4,590,855, Cl. 101-157.000.

Schraut, Alfred; and Weissenberger, Helmuth, to Fichtel & Sachs AG. Clutch disc for a motor vehicle friction clutch. 4,591,040, Cl. 192-106.200.

Schreiter, Michael. Focusing arrangement for a reflecting telescope. 4,591,245, Cl. 350-504.000.

Schroder, Ernst, to Licentia Patent-Verwaltungs-GmbH. Circuit arrangement for generating a control voltage which is dependent upon an alternating voltage. 4,591,733, Cl. 307-246.000.

Schroeppel, Edward A.: *See*—
Saulson, Stanley H.; Schroeppel, Edward A.; and Tarjan, Peter P., 4,590,941, Cl. 128-419.0PG.

Schubert & Salzer: *See*—
Fahmuller, Max, 4,590,647, Cl. 19-262.000.

Schuler, Norman W.: *See*—
Racich, James L.; Schuler, Norman W.; and Trapani, Giorgio B., 4,591,512, Cl. 427-163.000.

Schumacher, Clemens: *See*—
Finke, Robert-Gunter; Schumacher, Clemens; Kolb, Albert; Lautenschlager, Horst; and Konetzka, Jurgen, 4,591,050, Cl. 206-222.000.

Schumann, Peter R., to Cooper Industries, Inc. Modular rolling conductor support. 4,590,961, Cl. 137-355.160.

Schurch, Robert, to Zellweger Uster Ltd. Process and device for monitoring single strands in stranding processes. 4,591,995, Cl. 364-507.000.

Schurfeld, Horst: *See*—
Westerteicher, Wolfgang; and Schurfeld, Horst, 4,591,306, Cl. 409-179.000.

Schuurmans, Hubertus J. A.: *See*—
Pek, Johan J. B.; and Schuurmans, Hubertus J. A., 4,591,367, Cl. 55-344.000.

Schwartz, Harold L.: *See*—
Brenman, Henry S.; Schwartz, Harold L.; and Katz, Philip, 4,590,942, Cl. 128-419.00R.

Schwartz, Reinhard: *See*—
Hofmann, Eberhard; Pfeifle, Helmut; Schwartz, Reinhard; and Tschoeke, Helmut, 4,590,903, Cl. 123-300.000.

Schwarz, Albrecht; and Sosnowski, John D., to International Telephone and Telegraph Corporation. Regulated power supply for rapid no-load to full-load transitions. 4,591,962, Cl. 363-15.000.

Schwarzberger, Michael, to ABM Industries, Inc. Shape forming and quilting method. 4,590,877, Cl. 112-262.300.

Schweizer, Ernst, to Ciba-Geigy Corporation. Antidiabetic iminosulphonamides. 4,591,597, Cl. 514-392.000.

Sciambi, Orlando L.; and Valtri, Frank J. Insulating enclosure for a ceiling opening. 4,591,022, Cl. 182-47.000.

Sciotti, Robert; and Mocko, Dean E., to Colt Industries Operating Corp. Fuel injection valve assembly. 4,590,911, Cl. 123-468.000.

SCM Corporation: *See*—
DePasquale, Ralph J.; and Wilson, Michael E., 4,591,652, Cl. 556-419.000.

Scordo, Dominick, to AT&T Bell Laboratories. Common control audio decryptor. 4,591,660, Cl. 178-22.050.

Scott, Harold H.; and Scott, Ralph K., to Columbia Fabricators. Method for casting concrete members. 4,591,474, Cl. 264-253.000.

Scott, John E.; and Griffiths, Harold, to Shell Internationale Research Maatschappij B. V. Cable cleaning system. 4,591,390, Cl. 134-15.000.

Scott, Peter R., to British Aerospace Public Limited Company. Spacecraft nutation damping. 4,591,117, Cl. 244-170.000.

Scott, Ralph K.: *See*—
Scott, Harold H.; and Scott, Ralph K., 4,591,474, Cl. 264-253.000.

Sebrn Corporation: *See*—
Braun, Leon, 4,592,012, Cl. 364-900.000.

Secord, Ronald J.: *See*—
Karlichek, Gregory J.; and Secord, Ronald J., 4,591,128, Cl. 248-652.000.

Sedlak, Vaclav; Jurny, Josef; and Luner, Vaclav, to ZVS Adamovske strojirny, koncernovy podnik. Mechanism for the control of the inker

unit on accessory devices of printing machines. 4,590,858, Cl. 101-352.000.
Seefried, Carl G., Jr.: *See—*
Campbell, Gregory A.; and Seefried, Carl G., Jr., 4,591,607, Cl. 521-137.000.
Seguin, Marc: *See—*
Bouffard, Jean; Dumoulin, Andre ; and Seguin, Marc, 4,590,754, Cl. 57-58.550.
Segura, Joseph W.; and Vance, James F., Sr. Medical retriever device. 4,590,938, Cl. 128-328.000.
Seiko Epson Corporation: *See—*
Morozumi, Shinji; Misawa, Toshiyuki; and Nakazawa, Yoshio, 4,591,848, Cl. 340-784.000.
Seiler, Norman C., to Harris Corporation. Gray code DAC ladder. 4,591,826, Cl. 340-347.0DA.
Sekiguchi, Yoshihiro; Yoshida, Kazutoshi; Chiba, Shinsaku; Sugie, Mamoru; and Aoki, Hirokazu, to Hitachi, Ltd. Magnetic bubble memory device. 4,592,016, Cl. 365-15.000.
Semiconductor Energy Laboratory Co., Ltd.: *See—*
Kobayashi, Kenkichiro, 4,591,453, Cl. 252-182.100.
Yamazaki, Shumpei, 4,591,892, Cl. 357-30.000.
Yamazaki, Shunpei, 4,591,893, Cl. 357-30.000.
Sene, Jean-Michel M.: *See—*
Duroyon, Herve D.; and Sene, Jean-Michel M., 4,590,830, Cl. 17-49.000.
Senga, Yasushi: *See—*
Ito, Katsuo; Senga, Yasushi; and Murata, Yoshio, 4,591,814, Cl. 333-177.000.
Senkow, Walter: *See—*
Berg, Jeremy R.; Loveless, John G.; and Senkow, Walter, 4,590,721, Cl. 52-169.100.
Senzaki, Shigeo; Ikeuchi, Jun-ichiro; Matsui, Toshikazu; and Sawazaki, Norikazu, to Tokyo Shibaura Denki Kabushiki Kaisha. Head for recording an information signal in and reproducing the same from a semiconductor recording medium. 4,592,041, Cl. 369-126.000.
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Sessum, Charles E. Emergency vehicle battery circuit breaker. 4,591,675, Cl. 200-52.00R.
Seton Company: *See—*
Cioca, Gheorghe, 4,591,501, Cl. 424-28.000.
Shaffer, Howard R., to AMP Incorporated. Limited insertion force contact terminals and connectors. 4,591,222, Cl. 339-74.00R.
Shaffer, Jacob E.; Dellinger, Wayne D.; and Harnish, James R., to Borg-Warner Corporation. Control system for defrosting the outdoor coil of a heat pump. 4,590,771, Cl. 62-156.000.
Shaginian, Albert S.; Pevnev, Anatoly A.; Asan-Dzhalalov, Alexei G.; Androsenko, Alexandr P.; Palkin, Leonid N.; and Klimovich, Elena I., to Spetsialnoe Konstruktorskoe Bjuro Seismicheskoi Tekhniki. Well tubing handling apparatus. 4,591,007, Cl. 175-85.000.
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Matsukawa, Naohiro; Isobe, Mitsuo; and Sakurai, Takayasu, 4,592,026, Cl. 365-203.000.
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Hughes, Anthony J.; Saunders, Frances C.; and Shanks, Ian A., 4,591,849, Cl. 340-784.000.
Sharp, Graham D. F. Remotely activatable alarm system. 4,591,835, Cl. 340-574.000.
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Akao, Hideyuki, 4,591,681, Cl. 219-10.55B.
Hayakawa, Toshiro; Miyauchi, Nobuyuki; and Yano, Seiki, 4,592,060, Cl. 372-44.000.
Masaki, Yoshifumi, 4,592,027, Cl. 365-203.000.
Takeuji, Koichi, 4,591,682, Cl. 219-10.55F.
Tanabe, Takeshi; Fujikawa, Kuniyoshi; Yasuda, Takatoshi; and Takeoka, Nobuo, 4,591,684, Cl. 219-10.55B.
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Shattuck, Alan B.; and Couch, Robert P., to United Technologies Corporation. Gas turbine access port plug electrostatic probe. 4,591,794, Cl. 324-464.000.
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Olsen, William L.; Freeborn, John O.; Shaver, Linnea J.; and Kelemen, Janice J., 4,591,485, Cl. 422-20.000.
Sheffer Collet Company: *See—*
Stone, William, 4,591,171, Cl. 279-4.000.
Shell Internationale Research Maatschappij B. V.: *See—*
Scott, John E.; and Griffiths, Harold, 4,591,390, Cl. 134-15.000.
Shell Offshore Inc.: *See—*
Collipp, Bruce G., 4,591,295, Cl. 405-195.000.
Stevens, James W.; and Petersen, William H., 4,591,292, Cl. 405-169.000.
Shell Oil Company: *See—*
Pek, Johan J. B.; and Schuurmans, Hubertus J. A., 4,591,367, Cl. 55-344.000.
Pronk, Gerrit J., 4,591,428, Cl. 208-165.000.
Scholes, Gary; and van Helden, Robert, 4,591,457, Cl. 260-239.00A.
Shen, Shannon N., to ITT Corporation. Power-on reset pulse generator. 4,591,745, Cl. 307-592.000.
Shepherd, Neal H.: *See—*
Benedetto, Joseph A.; and Shepherd, Neal H., 4,591,661, Cl. 179-2.0EA.
Sherman, John D.: *See—*
Chao, Chien C.; and Sherman, John D., 4,591,388, Cl. 127-46.300.
Sherwood, Michael D.; Gregor, William T.; Snyder, Kenneth D.; El-Kilani, Saddah; and Roth, Richard W., to Engineered Systems, Inc. Data scrambling system and method. 4,591,704, Cl. 235-380.000.
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Kikuya, Satoshi; Minamide, Seiko; and Shibaike, Narito, 4,591,936, Cl. 360-132.000.
Shibata, Norio: *See—*
Mifuji, Ken; and Shibata, Norio, 4,590,762, Cl. 60-293.000.
Shibaura Kenki Kabushiki Kaisha: *See—*
Suzuki, Hiroaki; and Sasaki, Itsuo, 4,592,021, Cl. 365-189.000.
Shiga, Takashi, to Osawa Press Mfg. Co., Ltd. Single revolution clutch. 4,591,036, Cl. 192-27.000.
Shigeyama, Shigeo: *See—*
Ueda, Masahiro; and Shigeyama, Shigeo, 4,591,035, Cl. 192-3.590.
Shikoku Kakooki Co., Ltd.: *See—*
Ueda, Kazuo, 4,590,734, Cl. 53-52.000.
Shimada, Yasuomi, to Matsushita Electric Industrial Co., Ltd. Speaker apparatus. 4,592,088, Cl. 381-90.000.
Shimakura, Yoshiteru: *See—*
Shimizu, Toshihide; Kaneko, Ichiro; and Shimakura, Yoshiteru, 4,591,391, Cl. 134-22.170.
Shimano Industrial Company Limited: *See—*
Ban, Masuo, 4,591,108, Cl. 242-84.50R.
Nagano, Masashi, 4,591,026, Cl. 188-2.00D.
Shimazaki, Osamu: *See—*
Urabe, Hitoshi; Matsumoto, Masayuki; Kudo, Hisashi; and Shimazaki, Osamu, 4,591,904, Cl. 358-75.000.
Shimizu, Hiroshi: *See—*
Sato, Akihiro; Tachibana, Masami; Shimizu, Hiroshi; and Uwai, Toshihiro, 4,591,577, Cl. 502-105.000.
Shimizu, Isao: *See—*
Yamada, Kazuji; Kobayashi, Ryoichi; Nagai, Yasuo; Shimizu, Isao; and Kawakami, Kanji, 4,591,780, Cl. 323-313.000.
Shimizu, Masami: *See—*
Funyu, Yutaka; Okumura, Tadashi; Monno, Asao; and Shimizu, Masami, 4,590,658, Cl. 29-464.000.
Shimizu, Shokichi; Aoki, Hideji; Kida, Susumu; and Kanazawa, Yuki, to Fujitsu Limited. Package for electronic device and method for producing same. 4,590,672, Cl. 29-827.000.
Shimizu, Toshihide; Kaneko, Ichiro; and Shimakura, Yoshiteru, to Shin-Etsu Chemical Co., Ltd. Method for removing polymer scale deposited on reactor walls and a polymer scale remover agent therefor. 4,591,391, Cl. 134-22.170.
Shimoda, Keitaro, to Nissho Corporation. Specific gravity indicator. 4,590,800, Cl. 73-449.000.
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Shin-Etsu Chemical Co., Ltd.: *See—*
Okinoshima, Hiroshige, 4,591,608, Cl. 522-13.000.
Shimizu, Toshihide; Kaneko, Ichiro; and Shimakura, Yoshiteru, 4,591,391, Cl. 134-22.170.
Shindo, Masanari: *See—*
Sasa, Nobumasa; Sato, Yuzuru; Ohta, Tatsuo; and Shindo, Masanari, 4,591,544, Cl. 430-166.000.
Shinichi, Tamba: *See—*
Fujikawa, Tetsuzo; and Shinichi, Tamba, 4,590,891, Cl. 123-41.110.
Shinko Kosen Kogyo Kabushiki Kaisha: *See—*
Kurauchi, Makoto; Kobayashi, Takeshi; Izumi, Masakazu; and Aota, Jiro, 4,590,724, Cl. 52-223.00L.
Shintani, Kenji: *See—*
Kubota, Shigeo; and Shintani, Kenji, 4,592,038, Cl. 369-44.000.
Shinto Paint Co., Ltd.: *See—*
Kubo, Akira; Nishizaki, Kan; and Okado, Yasuomi, 4,591,609, Cl. 523-336.000.
Shiomi, Makoto: *See—*
Miura, Kuniaki; Kobori, Yasunori; Fukushima, Isao; Shiomi, Makoto; and Kano, Kenji, 4,591,798, Cl. 329-102.000.
Shiraishi, Kazuhisa: *See—*
Sakuma, Masashi; Nakagoshi, Kazuo; Shiraishi, Kazuhisa; and Ozaki, Shoji, 4,591,939, Cl. 360-46.000.
Shiratsuki, Yoshiyuki, to Fuji Xerox Co., Ltd. Thermal recording head device. 4,591,877, Cl. 346-76.0PH.
Shoemaker, Gerald L.: *See—*
Hoskin, Dennis H.; Rollmann, L. Deane; Shoemaker, Gerald L.; and Schmitt, Kirk D., 4,590,996, Cl. 166-244.100.
Shu, Stephen K., to Del Mar Avionics. High-intensity opto-electronic sensor having low power consumption. 4,591,708, Cl. 250-221.000.
Siadat, Bahram: *See—*
Jenkins, Robert F.; and Siadat, Bahram, 4,591,611, Cl. 524-64.000.
Sibalis, Jack I.: *See—*
Karam, Fouad T.; and Sibalis, Jack I., 4,591,613, Cl. 524-597.000.
Siddall, Graham J.: *See—*
Eaton, Steven G.; and Siddall, Graham J., 4,592,081, Cl. 378-34.000.
Siegel, Ronald: *See—*
Cohen, Jonathan M.; Siegel, Ronald; and Langer, Robert, 4,591,496, Cl. 424-15.000.
Siemens Aktiengesellschaft: *See—*
Altmann, Franz; Granz, Bernd; Grenda, Dieter; and Oppelt, Ralph, 4,592,029, Cl. 367-7.000.
Fundneider, Oswald, 4,592,045, Cl. 370-58.000.
Fundneider, Oswald, 4,592,047, Cl. 370-58.000.
Hoenig, Eckhardt, 4,591,787, Cl. 324-248.000.
Krause, Norbert, 4,590,947, Cl. 128-653.000.
Nussel, Lothar; and Radmer, Alfred, 4,591,775, Cl. 318-711.000.

Rauch, Werner; Schmitt, Guenter; and Tschunt, Edgar, 4,592,080, Cl. 378-19.000.
Taumberger, Franz, 4,591,711, Cl. 250-227.000.
Westermeier, Heinz, 4,592,059, Cl. 372-36.000.
Wollscheid, Dieter, 4,592,010, Cl. 364-900.000.
Sierra, Rafael. Doorlock. 4,590,777, Cl. 70-104.000.
SIG Schweizerische Industrie-Gesellschaft: *See*—
Schmidt, Edi, 4,590,977, Cl. 141-129.000.
Sigel, George H., Jr.: *See*—
Koo, Kee P.; and Sigel, George H., Jr., 4,591,786, Cl. 324-244.000.
Signode Paper Products Company: *See*—
Liebel, Henry L., 4,591,519, Cl. 428-35.000.
Silfvast, William T., to AT&T Bell Laboratories. Inner-shell d-electron photoionization apparatus. 4,592,064, Cl. 372-73.000.
Silva, Fernando J.: *See*—
Krasuk, Julio H.; Silva, Fernando J.; Galiasso, Roberto E.; and Souto, Alfredo, 4,591,426, Cl. 208-96.000.
Silverman, Warren J. Process of making a coated abrasive for diamond grinding wheels. 4,591,363, Cl. 51-293.000.
Simmonds Precision Products, Inc.: *See*—
Lutton, David B.; and Melnick, Joel N., 4,590,806, Cl. 73-862.340.
Simmons, Catherine J.: *See*—
Macedo, Pedro B.; Sutter, Herbert G.; Mohr, Robert K.; and Simmons, Catherine J., 4,591,455, Cl. 252-629.000.
Simon, Ralph E., to General Instrument Corporation. Method and apparatus for assembling semiconductor devices such as LEDs or optodetectors. 4,590,667, Cl. 29-589.000.
Simpson, William M.: *See*—
Ruiz, Antonio R.; and Simpson, William M., 4,590,717, Cl. 52-64.000.
Sims, Dewey M., Jr., to Northern Telecom Limited. Cartridge latching mechanism. 4,591,934, Cl. 360-93.000.
Sims, George E. Photodetector. 4,591,706, Cl. 235-454.000.
Sines, Randy D.; and Farber, Bruce W., to Karakal Corp. of the Americas. Racket having strings which pass over rockable tension transmitting means. 4,591,165, Cl. 273-73.00D.
Singh, Harjit: *See*—
Livings, Rodney; and Singh, Harjit, 4,590,679, Cl. 33-361.000.
Singleton, E. Freel: *See*—
Ghahremani, A. Moayed; and Singleton, E. Freel, 4,590,727, Cl. 52-406.000.
Sinha, Rabindra K. Process for separating porous materials from less porous materials. 4,591,431, Cl. 209-3.000.
Sirois, Herbert J.; and Wheeler, Kenneth A., to Terry Corporation of Connecticut. Valve. 4,590,969, Cl. 137-637.200.
Sita Bauelemente GmbH: *See*—
Jansen, Hansjurgen; and Gelsen, Karl-Heinz, 4,591,729, Cl. 307-116.000.
Sjut, Volkert: *See*—
Krahmer, Hansjorg; Rusch, Reinhart; Kruger, Hans-Rudolf; and Sjut, Volkert, 4,591,376, Cl. 71-90.000.
SKF GmbH: *See*—
Schneider, Karl-Heinz; Paeschke, Otto; Del Fabro, Michael; and Loeser, Norbert, 4,591,276, Cl. 384-206.000.
SKF Industrial Trading & Development Company B.V.: *See*—
van Amerongen, Evert, 4,590,657, Cl. 29-458.000.
SKF Kugellagerfabriken GmbH: *See*—
Olschewski, Armin; Brandenstein, Manfred; Walter, Lothar; and Ernst, Horst M., 4,591,352, Cl. 474-95.000.
Skolnik, Howard L.: *See*—
Anderson, Thomas R.; Skolnik, Howard L.; and Trump, Bruce C., 4,591,740, Cl. 307-310.000.
SKW Trostberg Aktiengesellschaft: *See*—
Klima, Hubertus; and Jekat, Herbert, 4,591,493, Cl. 423-383.000.
Slater, Olin. Portable clamp and anchor. 4,591,148, Cl. 272-93.000.
Sloan-Kettering Institute for Cancer Research: *See*—
Mattes, M. Jules; Thomson, Timothy M.; Old, Lloyd J.; and Lloyd, Kenneth O., 4,591,572, Cl. 436-538.000.
Sloan Valve Company: *See*—
Schmitt, Eugene W.; and Stoltenberg, Michael R., 4,590,967, Cl. 137-613.000.
Smejkal, Hellmuth; Rockenschaub, Walter; and Fohler, Johann, to Voest-Alpine Aktiengesellschaft. Arrangement for cleaning a lance head of a lance introducible into a metallurgical vessel. 4,591,134, Cl. 266-135.000.
Smith, Clark. Gutter system. 4,590,716, Cl. 52-12.000.
Smith, David B.; and Moore, John M., to Precor Incorporated. System for elevating an exercise treadmill. 4,591,147, Cl. 272-69.000.
Smith International, Inc.: *See*—
Henderson, Herman O., Jr.; and Coombs, Richard L., 4,591,296, Cl. 405-195.000.
Oliver, Michael S., 4,591,008, Cl. 175-227.000.
Smith, Jerry D.: *See*—
Paull, Mike M.; Smith, Jerry D.; and Schoenberg, Kathleen D., 4,590,943, Cl. 128-419.00D.
Smith, Karl E.; and Lin, Wei-Chung, to Bethea Electrical Products, Inc. Ground roller. 4,591,130, Cl. 254-134.3PA.
Smith, Roger J.: *See*—
Greenwood, David; and Smith, Roger J., 4,591,476, Cl. 264-328.140.
Smith, Somers H., III: *See*—
McCarty, George W.; and Smith, Somers H., III, 4,591,777, Cl. 320-2.000.
Smith, Steve. Rectifying network. 4,591,966, Cl. 363-91.000.
Smith, William B., to Bio-Environmental Systems, Inc. Biological indicator probe for steam sterilizing systems. 4,591,566, Cl. 435-291.000.
SMS Concast Inc.: *See*—
Poran, Michael; Langner, Carl; and Karolyi, Stephen, 4,590,984, Cl. 164-426.000.
Scholz, Heinrich; and Flemming, Gunter, 4,590,986, Cl. 164-448.000.
SMS Hasenclever Maxchinenfabrik GmbH: *See*—
Trimborn, Hermann-Josef, 4,590,787, Cl. 72-454.000.
SMS Schloemann-Siemag AG: *See*—
Klockner, Jurgen; and Rosenthal, Dieter, 4,590,778, Cl. 72-19.000.
SMW Schneider & Weisshaupt GmbH: *See*—
Hiestand, Karl, 4,591,172, Cl. 279-1.00J.
Snamprogetti, S.p.A.: *See*—
Gazzi, Luigi; D'Ambra, Roberto; Di Cintio, Roberto; Rescalli, Carlo; and Vetere, Alessandro, 4,591,370, Cl. 62-17.000.
Snaper, Alvin A. Fire extinguishing sprinkler valve. 4,590,999, Cl. 169-37.000.
Sneider, Vincent R. Container for drug isolation, storage and subsequent mixing. 4,591,357, Cl. 604-416.000.
Snia Fibre S.p.A.: *See*—
Cazzaro, Giorgio; Cavallaro, Antonino; Casagrande, Gianfranco; and Del Felice, Gianmarco, 4,591,361, Cl. 8-538.000.
Snyder, Irving F.; Vork, William D.; and Itzin, Michael, to Polaris Home Systems, Inc. Centrifugal sprayer having interchangeable feed mechanism. 4,591,096, Cl. 239-216.000.
Snyder, James R., to Parker Pen Company, The. Microlaminated coating. 4,591,418, Cl. 204-192.00P.
Snyder, Kenneth D.: *See*—
Sherwood, Michael D.; Gregor, William T.; Snyder, Kenneth D.; El-Kilani, Saddah; and Roth, Richard W., 4,591,704, Cl. 235-380.000.
So, Masaomi: *See*—
Sugiyama, Yasuo; So, Masaomi; Hamaguchi, Ichiro; and Maeda, Kenichi, 4,590,712, Cl. 51-161.000.
Sobel, David D. Apparatus for simultaneously cutting a plurality of picture frame mats. 4,590,834, Cl. 83-455.000.
Societe Cortial, S.A.: *See*—
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; Mosser, Jacqueline; and Pontagnier, Henri, 4,591,600, Cl. 514-456.000.
Societe d'Etudes de Machines Thermiques S.E.M.T., S.A.: *See*—
Devaux, Alain, 4,591,321, Cl. 417-499.000.
Societe Nationale Elf Aquitaine: *See*—
Paul, Francois; Monsan, Pierre; and Auriol, Daniel, 4,591,563, Cl. 435-193.000.
Societe Nationale Elf Aquitaine, Division Propriete Industrielle Tour Elf: *See*—
Arditty, Patricia; Arens, Georges; and Staron, Philippe, 4,592,030, Cl. 367-27.000.
Societe Nationale Elf Aquitaine (Production): *See*—
Fournie, Rene ; and Besnard, Francois, 4,591,191, Cl. 285-18.000.
Soden, George B.; and Miller, Gerald J., to North American Philips Corporation. Grommet unit and motor having such a unit. 4,591,747, Cl. 310-71.000.
Sogo, Toshio: *See*—
Kumabe, Hisao; Sogo, Toshio; and Takamiya, Saburo, 4,592,061, Cl. 372-45.000.
Sohval, A. Robert; Cooperstein, Gerald; Goldstein, Shyke A.; and Hearn, David R., to Elscint Ltd. Medical imaging device using triggered plasma cathode flash X-ray sources. 4,592,079, Cl. 378-9.000.
Sokolowski, Bronislaw. Adaptor for T.V. camera. 4,591,254, Cl. 354-223.000.
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Holland, Varnum S., 4,591,778, Cl. 320-39.000.
McCarty, George W.; and Smith, Somers H., III, 4,591,777, Cl. 320-2.000.
Solid State Scientific, Inc.: *See*—
Owens, Alexander H.; Halfacre, Mark A.; Huie, Wing K.; and Pan, David S., 4,590,665, Cl. 29-571.000.
Sollami, Phillip A. Semi-automatic grinding machine. 4,590,711, Cl. 51-3.000.
Solt, David: *See*—
Malis, Jerry L.; Malis, Leonard I.; Acorcey, Robert R.; and Solt, David, 4,590,934, Cl. 128-303.140.
Soneda, Mitsuo; Maekawa, Toshikazu; and Ohtsu, Takaji, to Sony Corporation. Solid state image pickup device. 4,591,916, Cl. 358-213.000.
Sonoco Products Company: *See*—
Collins, Thomas D.; and Ross, Glenn D., 4,591,050, Cl. 229-15.000.
Sony Corporation: *See*—
Furuya, Tsuneo; and Inazawa, Yoshizumi, 4,592,036, Cl. 369-32.000.
Hakamada, Kunio; Ishiguro, Satoshi; Wakabayashi, Hideo; and Ogawa, Kiyoshi, 4,591,914, Cl. 358-190.000.
Kubota, Shigeo; and Shintani, Kenji, 4,592,038, Cl. 369-44.000.
Ouchi, Koji; Tsurumaru, Shinobu; Kajiwara, Tadashi; and Kumamoto, Kenichiro, 4,592,093, Cl. 455-4.000.
Ouchi, Norikazu; Kayanuma, Akio; and Asano, Katsuaki, 4,591,398, Cl. 148-187.000.
Soneda, Mitsuo; Maekawa, Toshikazu; and Ohtsu, Takaji, 4,591,916, Cl. 358-213.000.
Tanaka, Yutaka; and Okada, Takashi, 4,591,911, Cl. 358-160.000.

Toyoguchi, Tsutomu; and Watanabe, Yoshiro, 4,592,039, Cl. 369-75.200.
Watari, Masao; Akabane, Makoto; Nishioka, Hisao; and Waku, Toshihiko, 4,592,085, Cl. 381-43.000.
Yamada, Takaaki, 4,592,078, Cl. 377-52.000.

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Sosnowski, John D.: *See—*
Schwarz, Albrecht; and Sosnowski, John D., 4,591,962, Cl. 363-15.000.

South African Invention Development Corporation: *See—*
Hunt, Michael S.; Mundell, Peter J.; and Strover, Angus E., 4,590,928, Cl. 128-92.00D.

Southwest Pump Company: *See—*
Pope, Woodrow W., 4,591,946, Cl. 361-284.000.

Souto, Alfredo: *See—*
Krasuk, Julio H.; Silva, Fernando J.; Galiasso, Roberto E.; and Souto, Alfredo, 4,591,426, Cl. 208-96.000.

Spang, Otto: *See—*
Mamberer, Hans; Zeller, Reinhard; and Spang, Otto, 4,590,856, Cl. 101-350.000.

Spani, Toni; and Lichtenstein, Rita, to Lichtenstein, Lispa R. Cooking vessel with cover guard. 4,590,919, Cl. 126-382.000.

Spaniola, Daniel F.: *See—*
Rosky, Leon; Anslow, Gabriel T.; Spaniola, Daniel F.; and Weintraub, Marvin H., 4,590,914, Cl. 123-557.000.

Spease, Arthur L.; and Walston, Holly, to Teleflex Incorporated. Motion transmitting remote control assembly molded terminal connector. 4,590,819, Cl. 74-501.00R.

Spector, George: *See—*
Feigenblatt, Nathan, Jr.; and Spector, George, 4,591,836, Cl. 340-574.000.
Hellenbrand, Odon; and Spector, George, 4,591,124, Cl. 248-447.200.

Speicher, Edwin W., to M. E. Cunningham Company. Marking machine for forming variable sized characters. 4,591,279, Cl. 400-121.000.

Speranzin, Claudio: *See—*
Bertoli, Luciano; Badiali, Roberto; and Speranzin, Claudio, 4,590,753, Cl. 57-22.000.

Sperry Corporation: *See—*
Ferris, Fred O., III; and Prival, Harri G., 4,591,973, Cl. 364-200.000.
Kregness, Glen R., 4,592,005, Cl. 364-736.000.

Spetsialnoe Konstruktorskoe Bjuro Seismicheskoi Tekhniki: *See—*
Shaginian, Albert S.; Pevnev, Anatoly A.; Asan-Dzhalalov, Alexei G.; Androsenko, Alexandr P.; Palkin, Leonid N.; and Klimovich, Elena I., 4,591,007, Cl. 175-85.000.

Spinell, Max; and Engstrom, Bertil, to N. Foss ApS. Method for separating bacteria from a bacteria containing liquid sample. 4,591,445, Cl. 210-781.000.

Spong, Richard V.: *See—*
Dornes, Bryan J.; Kautz, Jon F.; Paukovits, Edward J., Jr.; Spong, Richard V.; Talarico, Robert J.; and Prescott, Harry G., 4,590,673, Cl. 29-845.000.

Spraying Systems Co.: *See—*
Emory, Lyle J.; and Jones, Courtney J., 4,591,099, Cl. 239-419.000.

Spurny, Jiri: *See—*
Heckmann, Klaus; and Spurny, Jiri, 4,591,488, Cl. 423-11.000.

Square D Company: *See—*
Yin, Simon, 4,591,678, Cl. 200-144.00B.

Squitieri, Andrew, to Molex Incorporated. Arrangement for interconnecting a printed circuit board with a multi-conductor cable. 4,591,225, Cl. 339-99.00R.

Squitieri, Frank. Display frame assembly. 4,590,696, Cl. 40-156.000.

SRI International: *See—*
Acton, Edward M.; and Tong, George L., 4,591,637, Cl. 536-6.400.

Srivastava, Gopal K.: *See—*
Lai, Stephen H.; and Srivastava, Gopal K., 4,591,910, Cl. 358-148.000.

Staats, William L., Jr. Pressure pump with volumetric leak rate detector. 4,590,793, Cl. 73-40.000.

Staggs, Kevin P.: *See—*
Clarke, Charles J., Jr.; and Staggs, Kevin P., 4,591,842, Cl. 340-723.000.

Stahlecker, Fritz, to Stahlecker, Hans; and Stahlecker, Fritz. Open-end friction spinning. 4,590,756, Cl. 57-401.000.

Stahlecker, Fritz, to Stahlecker, Hans; and Stahlecker, Fritz. Feeding and opening device for an open-end spinning machine. 4,590,757, Cl. 57-412.000.

Stahlecker, Hans: *See—*
Stahlecker, Fritz, 4,590,756, Cl. 57-401.000.
Stahlecker, Fritz, 4,590,757, Cl. 57-412.000.

Stahlwerke Bochum AG: *See—*
Behringer, Jurgen; Pluciniczak, Hans-Friedrich; Syllwasschy, Wolfgang; and Loley, Franz, 4,591,529, Cl. 428-252.000.

Stamicarbon B.V.: *See—*
Leerschool, Joseph F. M.; and Dols, Hubert J., 4,591,644, Cl. 544-201.000.

Stanadyne, Inc.: *See—*
Kowal, Steven J.; and Lesher, Kenneth W., 4,590,899, Cl. 123-90.580.

Standard Oil Company (Indiana): *See—*
Bradshaw, David C.; Robinson, William C.; and Rossi, James R., 4,592,031, Cl. 367-45.000.
Ruckgaber, Gary M., 4,592,032, Cl. 367-73.000.

Standard Telephones & Cables Public Ltd. Co.: *See—*
Bricheno, Terry; Fielding, Alan; and Hewish, Nicholas A., 4,591,372, Cl. 65-4.200.

Stange, Ronald R.; Ekren, Dennis J.; and De Martelaere, Gary E., to Tools for Bending, Inc. Program-controlled frame bending method and apparatus. 4,590,779, Cl. 72-294.000.

Stanley Electric Co., Ltd.: *See—*
Kawamura, Toshihide; Kashiwabara, Hoichiro; Waki, Osamu; and Sakai, Hiro, 4,591,954, Cl. 362-61.000.

Stanton, Robert: *See—*
Rugg, Barry; and Stanton, Robert, 4,591,386, Cl. 127-1.000.

Stark, Manfred: *See—*
Schmidek, Reinhard; and Stark, Manfred, 4,591,288, Cl. 403-260.000.

Staron, Philippe: *See—*
Arditty, Patricia; Arens, Georges; and Staron, Philippe, 4,592,030, Cl. 367-27.000.

Starski, Wojciech, to RCA Corporation. Component lead processing device. 4,590,660, Cl. 29-566.300.

State of Israel, Atomic Energy Commission, Nuclear Research Center Negev, The: *See—*
Kafri, Oded; Livnat, Aminadav; and Keren, Eliezer, 4,590,681, Cl. 33-378.000.

Stauffer Chemical Company: *See—*
Leone-Bay, Andrea; and Timony, Peter E., 4,591,377, Cl. 71-92.000.
Michel, Christian G.; Marek, Henry S.; and Baumann, John A., 4,591,408, Cl. 156-605.000.

Stecher, Rolf: *See—*
Killat, Ulrich; Riekmann, Dieter; and Stecher, Rolf, 4,592,049, Cl. 370-87.000.

Steed, Ivan V.; and Gill, Jeffrey I., to Steed Signs Pty. Limited. Flag mounting. 4,590,883, Cl. 116-173.000.

Steed Signs Pty. Limited: *See—*
Steed, Ivan V.; and Gill, Jeffrey I., 4,590,883, Cl. 116-173.000.

Steele, James H., Jr.; Heckler, Alan J.; Flowers, James W., Jr.; and Powley, George S., to Armco Inc. Method of heat treating low carbon steel strip. 4,591,395, Cl. 148-12.00D.

Steffero, Robert F., Sr. Steam dryer drum. 4,590,688, Cl. 34-124.000.

Stegens, Ronald E.; and Hawisher, Gary G., to Communications Satellite Corporation. Coplanar waveguide quadrature hybrid having symmetrical coupling conductors for eliminating spurious modes. 4,591,812, Cl. 333-116.000.

Steilen, Ronald M., to Deere & Company. Double disk opener assembly and disk blade therefor. 4,590,869, Cl. 111-88.000.

Steinberg, Klaus, to Bayerische Motoren Werke, AG. Protective covering for the piston of a telescoping spring element. 4,591,137, Cl. 267-182.000.

Steinmetz, Manfried: *See—*
Lexer, Hans, 4,591,697, Cl. 219-348.000.

Stening, Goran B.: *See—*
Helgstrand, Ake J. E.; Johansson, Karl N.; Misiorny, Alfons; Noren, Jan O.; and Stening, Goran B., 4,591,583, Cl. 514-120.000.

Stenzel, Gerhard; and Kaule, Wittich, to Gao Gessellschaft fur Automation und Organisation mbH. Printed security with hallmarks. 4,591,707, Cl. 235-493.000.

Stephenson, Roger D., to Deere & Company. Double windrowing attachment for harvester. 4,590,751, Cl. 56-192.000.

Stern, Howard: *See—*
Hecker, Joel; and Stern, Howard, 4,591,253, Cl. 354-227.100.

Sternberg, Robert L.; and Anderson, Warren A., to United States of America, Navy. Frequency independent twisted wave front constant beamwidth lens antenna. 4,591,864, Cl. 343-754.000.

Stetter, Joseph R.: *See—*
Zaromb, Solomon; Otagawa, Takaaki; and Stetter, Joseph R., 4,591,414, Cl. 204-1.00T.

Stevens, James W.; and Petersen, William H., to Shell Offshore Inc. Subsea pull-in tool. 4,591,292, Cl. 405-169.000.

Stevens, John W.: *See—*
Gaskell, David J.; and Stevens, John W., 4,591,100, Cl. 239-533.300.

Stewart, Bruce E., Sr.; and Lyman, John B., to Whirlpool Corporation. Dust bag mount arrangement for canister vacuum cleaner. 4,591,369, Cl. 55-374.000.

Stewart, Douglas V.: *See—*
Moeller, Jerris C.; Stewart, Douglas V.; and Tabereaux, Alton T., 4,591,419, Cl. 204-243.00R.

Stewart, Jeffrey A. Magazine dispensing apparatus. 4,591,069, Cl. 221-6.000.

Stewart, Philip S. B.: *See—*
Andrews, John R.; Stewart, Philip S. B.; and Hurst, George T., 4,591,103, Cl. 241-4.000.

Stewart, Robert E. Decoder for self-clocking serial data communications. 4,592,072, Cl. 375-55.000.

Steyr-Daimler-Puch Aktiengesellschaft: *See—*
Lenhard-Backhaus, Hugo; and Kauer, Erhard, 4,591,349, Cl. 464-136.000.

Sticht, Walter, to STIWA-Fertigungstechnik Sticht GesmbH. Coding method and system for assembly line pallets. 4,591,991, Cl. 364-478.000.

Stiepek, Wolfgang: *See—*
Kaiser, Manfred; and Stiepek, Wolfgang, 4,591,231, Cl. 350-96.180.

Stihl, Andreas: *See—*
Wissmann, Michael; and Schliemann, Harald, 4,590,896, Cl. 123-73.00R.

STIWA-Fertigungstechnik Sticht GesmbH: *See—*
Sticht, Walter, 4,591,991, Cl. 364-478.000.

Stoelinga, Franciscus A., to U.S. Philips Corporation. Electron beam apparatus comprising a wire source. 4,591,753, Cl. 313-146.000.
Stoll, Kurt. Piston and cylinder actuator. 4,590,846, Cl. 92-151.000.
Stoltenberg, Michael R.: *See*—
Schmitt, Eugene W.; and Stoltenberg, Michael R., 4,590,967, Cl. 137-613.000.
Stone, Patrick B.: *See*—
Hanchett, Michael T.; Stone, Patrick B.; Bujack, Kurt W.; and Strand, Monte S., 4,590,680, Cl. 33-366.000.
Stone, William, to Sheffer Collet Company. Seal for air charging a chuck. 4,591,171, Cl. 279-4.000.
Stoner, Eugene A.: *See*—
Lim, Sam K.; Fong, Daniel D.; and Stoner, Eugene A., 4,591,284, Cl. 400-691.000.
Storey, Michael J., to Cambridge Consultants Limited. Digital-to-analog converter. 4,591,828, Cl. 340-347.0DA.
Stowe, Lawrence R., to Mobil Oil Corporation. Controlled pulse and peroxide fracturing combined with a metal containing proppant. 4,590,997, Cl. 166-250.000.
Stranahan, Mike: *See*—
Lew, Hyok S.; and Stranahan, Mike, 4,591,021, Cl. 182-10.000.
Strand, Monte S.: *See*—
Hanchett, Michael T.; Stone, Patrick B.; Bujack, Kurt W.; and Strand, Monte S., 4,590,680, Cl. 33-366.000.
Stratton, Paul P.: *See*—
Jackman, Peter R.; and Stratton, Paul P., 4,591,676, Cl. 200-61.45M.
Straub, Reinhold; and Eberhard, Eugen, to Hensler, Ewald. Microsurgical instrument. 4,590,936, Cl. 128-305.000.
Straub, Richard L.: *See*—
Pou, Frederick M.; and Straub, Richard L., 4,590,859, Cl. 101-426.000.
Strawczynski, Leo: *See*—
Chow, Peter E.; Weirich, Andreas H.; and Strawczynski, Leo, 4,592,070, Cl. 375-27.000.
Strepparola, Ezio: *See*—
Caporiccio, Gerardo; and Strepparola, Ezio, 4,591,444, Cl. 210-748.000.
Striebich, Helmut, to Dr. Ing. H.c.F Porsche AG. Exhaust gas steam turbine drive unit for automotive vehicles. 4,590,766, Cl. 60-618.000.
Stromberg, Jan, to Plannja AB. System for supporting an external corrugated roofing panel on an insulated roof structure. 4,590,728, Cl. 52-410.000.
Strover, Angus E.: *See*—
Hunt, Michael S.; Mundell, Peter J.; and Strover, Angus E., 4,590,928, Cl. 128-92.00D.
Sturm, Ruger & Company, Inc.: *See*—
Ruger, William B.; and Melcher, Roy L., 4,590,697, Cl. 42-70.00F.
Subtex, Inc.: *See*—
George, Stephen; and George, Thomas H., 4,591,516, Cl. 427-375.000.
Sugie, Mamoru: *See*—
Sekiguchi, Yoshihiro; Yoshida, Kazutoshi; Chiba, Shinsaku; Sugie, Mamoru; and Aoki, Hirokazu, 4,592,016, Cl. 365-15.000.
Sugihara, Hirosada; Nishikawa, Kohei; and Ito, Katsumi, to Takeda Chemical Industries, Ltd. 3-amino-4-oxo-2,3,4,5-tetrahydro-1,5-benzoxazepine derivatives. 4,591,458, Cl. 260-239.30B.
Sugino, Michael D.: *See*—
Lund, Clarence A.; and Sugino, Michael D., 4,591,890, Cl. 357-23.110.
Sugita, Katsuhiko; and Sainen, Tsutomu, to Tsudakoma Corp. Weft inserting apparatus for jet looms. 4,590,972, Cl. 139-435.000.
Sugita, Masatoshi: *See*—
Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi; Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, 4,591,558, Cl. 435-68.000.
Sugiura, Hiroaki: *See*—
Tsukada, Takami; Ota, Akiho; and Sugiura, Hiroaki, 4,591,060, Cl. 215-1.00C.
Sugiura, Masami, to Tokyo Petcage Co., Ltd. Collapsible animal cage. 4,590,885, Cl. 119-19.000.
Sugiyama, Shizuo: *See*—
Hagiwara, Yoshimune; Sugiyama, Shizuo; Maeda, Narimichi; Yumoto, Osamu; Akazawa, Takashi; Kobayashi, Masahito; Kita, Yasuhiro; and Kita, Yuzo, 4,592,006, Cl. 364-748.000.
Sugiyama, Yasuo; So, Masaomi; Hamaguchi, Ichiro; and Maeda, Kenichi, to Koyo Seike Company Limited; and Koyo Machine Industries Company. Vertical spindle duplex head for a grinder. 4,590,712, Cl. 51-161.000.
Sulin, George. Mixing nozzle for injection molding. 4,591,274, Cl. 366-336.000.
Sullivan, Ann C.: *See*—
Hamilton, James G.; Sullivan, Ann C.; Tobias, Lawrence D.; and Triscari, Joseph, 4,591,594, Cl. 514-339.000.
Sullivan, Donald F. System for contact printing with liquid photopolymers. 4,591,265, Cl. 355-100.000.
Sullivan, Jack O., to General Electric Company. Metal cutting tool adjuster and compensator. 4,590,828, Cl. 82-24.00R.
Sullivan, Thomas W., to Trad, Inc. Servo-linearized opto-electronic analog interface. 4,591,663, Cl. 179-2.00C.
Sumitomo Metal Industries, Ltd.: *See*—
Kobayashi, Sumio, 4,590,989, Cl. 164-504.000.
Summers, Frank V.; Meissner, David C.; and Brown, Ronald, to Midrex International B.V. Rotterdam, Zurich Branch. Method of generating a reducing gas. 4,591,380, Cl. 75-35.000.
Summers Mfg. Company, Inc.: *See*—
Gutschmidt, Paul C., 4,591,181, Cl. 280-476.00R.
Sun, Shan C.; and McGivern, James P., to Westinghouse Electric Corp. Signal quality monitor for protective relay system. 4,591,940, Cl. 361-68.000.
Sundstrand Corporation: *See*—
Markunas, Albert L., 4,591,317, Cl. 417-288.000.
Weber, Kent, 4,591,314, Cl. 417-47.000.
Sundstrand Data Control, Inc.: *See*—
Merhav, Shmuel J., 4,590,801, Cl. 73-510.000.
Suroff, Leonard W.: *See*—
Kolt, Stanley, 4,591,092, Cl. 236-49.000.
Susser, Mark: *See*—
Gauthier, Robert E.; and Susser, Mark, 4,591,749, Cl. 310-156.000.
Sutter, Herbert G.: *See*—
Macedo, Pedro B.; Sutter, Herbert G.; Mohr, Robert K.; and Simmons, Catherine J., 4,591,455, Cl. 252-629.000.
Suyama, Tadakazu: *See*—
Yokoyama, Kazumasa; Fukaya, Chikara; Isuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,591,593, Cl. 514-307.000.
Yokoyama, Kazumasa; Fukaya, Chikara; Tsuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,591,599, Cl. 514-413.000.
Suzuki, Hiroaki; and Sasaki, Itsuo, to Shibaura Kenki Kabushiki Kaisha. Data readout circuit for an MOS transistor array. 4,592,021, Cl. 365-189.000.
Suzuki, Migaku; Kobayashi, Toshio; Sasaki, Satoshi; and Imai, Shigeo, to Uni-Charm Corporation. Fibre-implanted nonwoven fabric and method for production thereof. 4,591,513, Cl. 427-200.000.
Suzuki, Nobuo, to Tokyo Shibaura Denki Kabushiki Kaisha. Solid state image sensor. 4,591,917, Cl. 358-213.000.
Suzuki, Takeshi; and Komori, Nobutoshi, to Chisso Corporation. Deodorized polyolefins and process for the preparation thereof. 4,591,633, Cl. 528-485.000.
Suzuki, Yasuo: *See*—
Ohnishi, Haruo; Kosuzume, Hiroshi; Suzuki, Yasuo; and Mochida, Ei, 4,591,504, Cl. 424-94.000.
Swihart, Terence J.: *See*—
Blizzard, John D.; and Swihart, Terence J., 4,591,622, Cl. 525-477.000.
Swinehart, Grant E.: *See*—
Foster, Robert W.; Lottes, Rosanna M.; and Swinehart, Grant E., 4,591,665, Cl. 179-18.0FH.
Swiss Aluminium Ltd.: *See*—
Sahai, Yogeshwar; and Clumpner, Joseph A., 4,591,338, Cl. 432-148.000.
Syllwasschy, Wolfgang: *See*—
Behringer, Jurgen; Pluciniczak, Hans-Friedrich; Syllwasschy, Wolfgang; and Loley, Franz, 4,591,529, Cl. 428-252.000.
Syntex (U.S.A.) Inc.: *See*—
Chowhan, Zaka-ud-Din T., 4,591,592, Cl. 514-301.000.
Syrop, Alan N.: *See*—
Temple, Stephen; Jones, Nigel J.; and Syrop, Alan N., 4,590,749, Cl. 53-576.000.
Szabo, Rene: *See*—
Levallois, Emile; Szabo, Rene; Clot, Jean; and Esteve, Daniel, 4,591,293, Cl. 405-170.000.
T & N Materials Research Limited: *See*—
Atkinson, Alan W.; Dearden, Katryna J.; Doyle, Christina; Lancaster, Janet M.; Marshall, Kenneth H.; and Robinson, Kay L., 4,591,166, Cl. 277-1.000.
T.V.S. S.p.A.: *See*—
Lui, Umberto, 4,591,530, Cl. 428-325.000.
Tabereaux, Alton T.: *See*—
Moeller, Jerris C.; Stewart, Douglas V.; and Tabereaux, Alton T., 4,591,419, Cl. 204-243.00R.
Tachibana, Masami: *See*—
Sato, Akihiro; Tachibana, Masami; Shimizu, Hiroshi; and Uwai, Toshihiro, 4,591,577, Cl. 502-105.000.
Taguchi, Yosio: *See*—
Ishida, Yoshiyuki; and Taguchi, Yosio, 4,590,894, Cl. 123-41.740.
Takaba, Yosuke, to Tamagawa Seiki Kabushiki Kaisha. Brushless direct current motor. 4,591,766, Cl. 318-254.000.
Takagi, Yoshiari: *See*—
Matsuki, Ikuo; Kamiya, Naoyuki; Ikeda, Toshimitsu; Takagi, Yoshiari; Iizuka, Yoshio; Yamaguchi, Yoshinobu; Funai, Hiroshi; Terasawa, Mutsumi; and Tasaka, Susumu, 4,590,905, Cl. 123-321.000.
Takahashi, Eiji: *See*—
Kuboyama, Morio; Harada, Yoshitsugu; Kawashiri, Akio; and Takahashi, Eiji, 4,591,571, Cl. 436-533.000.
Takahashi, Kazuhisa: *See*—
Kaneno, Nobuaki; and Takahashi, Kazuhisa, 4,591,464, Cl. 261-153.000.
Takahashi, Ryouichi, to Kabushiki Kaisha Toshiba. Diagnostic nuclear magnetic resonance apparatus. 4,591,790, Cl. 324-318.000.
Takahashi, Susumu; and Horiguchi, Kiwami, to Tokyo Kagaku Kikai Kabushiki Kaisha. Exposure control system for ophthalmic photographing apparatus. 4,591,249, Cl. 354-62.000.
Takahashi, Teruo; and Hayashi, Isao, to Nissan Motor Company, Limited. In-tank fuel feed pump supporting device. 4,591,319, Cl. 417-360.000.
Takahashi, Yuji: *See*—
Miyamoto, Koichi; Takahashi, Yuji; and Kikuchi, Yutaka, 4,591,884, Cl. 346-153.100.

Takahashi, Yutaka: *See*—
Tanikawa, Kouji; Matsui, Koichi; Taniguchi, Akira; Amano, Atsushi; Kanno, Masahide; and Takahashi, Yutaka, 4,590,924, Cl. 128-6.000.

Takamiya, Kikuzo; and Tamura, Yoshitaka, to Bridgestone Cycle Co., Ltd. Band brake assembly for bicycle. 4,591,027, Cl. 188-24.110.

Takamiya, Saburo: *See*—
Kumabe, Hisao; Sogo, Toshio; and Takamiya, Saburo, 4,592,061, Cl. 372-45.000.

Takano, Masao; and Asai, Eiichi, to Fuji Photo Film Co., Ltd. Radiation image reproducing apparatus. 4,591,922, Cl. 358-280.000.

Takeda Chemical Industries, Ltd.: *See*—
Sugihara, Hirosada; Nishikawa, Kohei; and Ito, Katsumi, 4,591,458, Cl. 260-239.30B.

Takeda, Takashi, to Canon Kabushiki Kaisha. Run length code decoder. 4,591,829, Cl. 340-347.0DD.

Takei, Toshihiro: *See*—
Matsuda, Takeshi; Miyamoto, Masasi; and Takei, Toshihiro, 4,591,311, Cl. 415-53.00T.

Takei, Yoshiaki: *See*—
Fujimaki, Yoshihide; Kudo, Koichi; Takei, Yoshiaki; and Nomori, Hiroyuki, 4,591,542, Cl. 430-59.000.

Takekawa, Hiroshi: *See*—
Banno, Taiichi; Fujimori, Ryo; Takekawa, Hiroshi; and Hijikata, Kazuo, 4,591,568, Cl. 436-180.000.

Takemae, Yoshihiro; Nakano, Tomio; and Sato, Kimiaki, to Fujitsu Limited. Semiconductor memory device having clamp circuits. 4,592,020, Cl. 365-189.000.

Takemae, Yoshihiro; Ogawa, Junji; Fujii, Yasuhiro; Nakano, Tomio; Tatematsu, Takeo; Horii, Takashi; Nakano, Masao; and Tsuge, Norihisa, deceased (by Tsuge, Itaru, Sachie Tsuge, heirs), to Fujitsu Limited. Information storing circuit using blown and unblown fuses. 4,592,025, Cl. 365-200.000.

Takeoka, Nobuo: *See*—
Tanabe, Takeshi; Fujikawa, Kuniyoshi; Yasuda, Takatoshi; and Takeoka, Nobuo, 4,591,684, Cl. 219-10.55B.

Takeuchi, Haruki: *See*—
Okabe, Jiro; Fujie, Shunji; and Takeuchi, Haruki, 4,590,784, Cl. 72-389.000.

Takeuchi, Hiroshi; and Hamada, Toru, to Kabushiki Kaisha Daikin Seisakusho. Damper disc with self-aligning spring seats. 4,591,348, Cl. 464-64.000.

Takeuchi, Shuhei, to Alps Electric Co., Ltd. Printer electromagnetic clutch drive. 4,591,882, Cl. 346-136.000.

Takeuji, Koichi, to Sharp Kabushiki Kaisha. Microwave oven with improved turntable drive. 4,591,682, Cl. 219-10.55F.

Takimoto, Koichi: *See*—
Ueda, Ikuo; Morino, Daizo; and Takimoto, Koichi, 4,591,590, Cl. 514-252.000.

Talarico, Robert J.: *See*—
Dornes, Bryan J.; Kautz, Jon F.; Paukovits, Edward J., Jr.; Spong, Richard V.; Talarico, Robert J.; and Prescott, Harry G., 4,590,673, Cl. 29-845.000.

Tallman, Walter E.: *See*—
Wentzel, Robert J.; and Tallman, Walter E., 4,591,141, Cl. 271-127.000.

Tamagawa Seiki Kabushiki Kaisha: *See*—
Takaba, Yosuke, 4,591,766, Cl. 318-254.000.

Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi; Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, to Toyama Chemical Co., Ltd. Novel substances having antitumor and immunostimulating activity, process for preparing the same and antitumor agent containing the same. 4,591,558, Cl. 435-68.000.

Tamba, Shinichi; and Fukui, Noboru, to Kawasaki Jukogyo Kabushiki Kaisha. Fan housing for engine. 4,590,890, Cl. 123-41.700.

Tamblyn, Robert T. Thermal storage systems with antiblending disc. 4,590,992, Cl. 165-104.190.

Tamehiro, Hiroshi: *See*—
Mazuda, Hiroo; Tamehiro, Hiroshi; Ohashi, Mamoru; Onoe, Yasumitsu; and Tamukai, Shinogu, 4,591,396, Cl. 148-12.00F.

Tamukai, Shinogu: *See*—
Mazuda, Hiroo; Tamehiro, Hiroshi; Ohashi, Mamoru; Onoe, Yasumitsu; and Tamukai, Shinogu, 4,591,396, Cl. 148-12.00F.

Tamura, Teizo: *See*—
Miura, Kuniaki; Okada, Yoshinori; Fukushima, Isao; and Tamura, Teizo, 4,591,924, Cl. 358-330.000.

Tamura, Yoshitaka: *See*—
Takamiya, Kikuzo; and Tamura, Yoshitaka, 4,591,027, Cl. 188-24.110.

Tanabe, Masatoshi; and Mikata, Kenzo, to Hitachi, Ltd. Water purifier. 4,591,438, Cl. 210-282.000.

Tanabe, Takeshi; Fujikawa, Kuniyoshi; Yasuda, Takatoshi; and Takeoka, Nobuo, to Sharp Kabushiki Kaisha. Cooking completion detection in a cooking appliance. 4,591,684, Cl. 219-10.55B.

Tanaka, Haruhiko: *See*—
Makabe, Hachiro; Tanaka, Haruhiko; and Kongoh, Takashi, 4,590,880, Cl. 112-445.000.

Tanaka, Hiroshi; Mitani, Sotozi; and Sakurai, Yasushi, to Nissan Motor Co., Ltd. Press forming process and apparatus therefor. 4,590,783, Cl. 72-384.000.

Tanaka, Hitoshi, to Mitsubishi Denki Kabushiki Kaisha. System for displaying tool parameters of tools utilized in a machining process. 4,591,989, Cl. 364-474.000.

anaka, Kazuyuki; and Nishigaki, Noriaki, to Kabushiki Kaisha Toshiba. Exhaust apparatus for electric lamps. 4,590,976, Cl. 141-66.000.

Tanaka, Minoru; Kawabe, Tadashi; and Kobune, Masafumi, to Tateho Kagaku Kogyo Kabushiki Kaisha. Method of manufacturing crystalline silicon carbide employing acid pretreated rice husks. 4,591,492, Cl. 423-345.000.

Tanaka, Yoshiharu, to Bando Chemical Industries, Ltd. Flooring. 4,591,532, Cl. 428-493.000.

Tanaka, Yutaka; and Okada, Takashi, to Sony Corporation. Picture filter using an amplitude correlator. 4,591,911, Cl. 358-160.000.

Taniguchi, Akira: *See*—
Tanikawa, Kouji; Matsui, Koichi; Taniguchi, Akira; Amano, Atsushi; Kanno, Masahide; and Takahashi, Yutaka, 4,590,924, Cl. 128-6.000.

Tanikawa, Kouji; Matsui, Koichi; Taniguchi, Akira; Amano, Atsushi; Kanno, Masahide; and Takahashi, Yutaka, to Olympus Optical Co., Ltd. Endoscope system. 4,590,924, Cl. 128-6.000.

Tanimoto, Yoshio; and Atobe, Masaaki, to NEC Corporation. PSK demodulator having an AFC circuit. 4,591,797, Cl. 329-50.000.

Taniyama, Yoshiharu: *See*—
Saruwatari, Ryoji; and Taniyama, Yoshiharu, 4,591,261, Cl. 355-4.000.

Tank, Gene: *See*—
Kreeger, Ken; and Tank, Gene, 4,590,884, Cl. 118-308.000.

Tanuma, Itsuo: *See*—
Naito, Kazuo; Fuse, Tadashi; Tanuma, Itsuo; Fukuura, Yukio; and Ishikawa, Hikaru, 4,591,618, Cl. 525-279.000.

Tarjan, Peter P.: *See*—
Saulson, Stanley H.; Schroeppel, Edward A.; and Tarjan, Peter P., 4,590,941, Cl. 128-419.0PG.

Tasaka, Shigeru: *See*—
Miyata, Seizo; Tasaka, Shigeru; Saito, Kazuo; Seo, Iwao; Nakajima, Kenji; and Kosaka, Takeshi, 4,591,465, Cl. 264-22.000.

Tasaka, Susumu: *See*—
Matsuki, Ikuo; Kamiya, Naoyuki; Ikeda, Toshimitsu; Takagi, Yoshiari; Iizuka, Yoshio; Yamaguchi, Yoshinobu; Funai, Hiroshi; Terasawa, Mutsumi; and Tasaka, Susumu, 4,590,905, Cl. 123-321.000.

Tasch, Al F., Jr.: *See*—
Chatterjee, Pallab K.; and Tasch, Al F., Jr., 4,591,891, Cl. 357-23.120.

Tash, George. Fluid conduit assembly. 4,591,194, Cl. 285-249.000.

Tateho Kagaku Kogyo Kabushiki Kaisha: *See*—
Tanaka, Minoru; Kawabe, Tadashi; and Kobune, Masafumi, 4,591,492, Cl. 423-345.000.

Tatematsu, Takeo: *See*—
Takemae, Yoshihiro; Ogawa, Junji; Fujii, Yasuhiro; Nakano, Tomio; Tatematsu, Takeo; Horii, Takashi; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,592,025, Cl. 365-200.000.

Tateoka, Kiyoshi; and Ando, Hiromi, to Tokico Ltd. Pneumatic servo booster. 4,590,845, Cl. 91-369.00A.

Taumberger, Franz, to Siemens Aktiengesellschaft. Transmitting and receiving device for optoelectronic communication systems, and method of making the device. 4,591,711, Cl. 250-227.000.

Tayco Developments, Inc.: *See*—
Antkowiak, Robert G., 4,591,030, Cl. 188-268.000.
Taylor, Douglas P., 4,591,033, Cl. 188-317.000.

Taylor, Douglas P., to Tayco Developments, Inc. Shock absorber with fluid amplified flow at central portion of piston head. 4,591,033, Cl. 188-317.000.

TBT Tiefbohrteckhik GmbH & Co. KG: *See*—
Weiblen, Richard; and Jenny, Werner, 4,591,300, Cl. 408-59.000.

TDK Corporation: *See*—
Nishimatsu, Masaharu; Ide, Toshiaki; Kubota, Yuichi; Saito, Yoshiaki; and Arioka, Hiroyuki, 4,591,528, Cl. 428-212.000.
Yagi, Hiroshi; and Harada, Yoshio, 4,590,659, Cl. 29-564.600.

Technical Designs Incorporated: *See*—
Hanchett, Michael T.; Stone, Patrick B.; Bujack, Kurt W.; and Strand, Monte S., 4,590,680, Cl. 33-366.000.

Technology Venture Management, Inc.: *See*—
Dornbush, Donald H.; and Bowersox, Donald J., 4,591,974, Cl. 364-200.000.

Tekelec-Airtronic: *See*—
Asscher, Jean-Claude, 4,591,952, Cl. 361-433.000.

Tekken Construction Co., Ltd.: *See*—
Horimatsu, Kazuo, 4,591,297, Cl. 405-258.000.

Teknowledge, Inc.: *See*—
Bennett, James S.; and Lark, Jay S., 4,591,983, Cl. 364-403.000.

Telectronics Pty, Limited: *See*—
Iwaszkiewicz, Jerzy G.; and Kuxma, Janusz, 4,590,950, Cl. 128-786.000.

Teleflex Incorporated: *See*—
Spease, Arthur L.; and Walston, Holly, 4,590,819, Cl. 74-501.00R.

Telefonaktiebolaget LM Ericsson: *See*—
Englund, Allan H. E.; and Eriksson, Stefan G., 4,591,867, Cl. 343-841.000.
Frizlen, Hans-Jorg, 4,592,051, Cl. 370-103.000.
Kemstedt, Clas A., 4,591,964, Cl. 363-24.000.

Telefunken electronic GmbH: *See*—
Ziegler, Johann, 4,591,410, Cl. 156-616.00R.

Tellert, Rudy; and Peschel, Rudolf, to Sachs-Systemtechnik GmbH. Controllable drive for a movable releaser of a motor vehicle friction clutch. 4,591,034, Cl. 192-3.580.

Temple, Stephen; Jones, Nigel J.; and Syrop, Alan N., to Devro, Inc. Apparatus for and method of shirring a tubular casing. 4,590,749, Cl. 53-576.000.

Tensiodyne Scientific Corporation: *See*—
Brull, Maurice A., 4,590,804, Cl. 73-762.000.

Teramoto, Toshio: *See—*
Kato, Hiroshi; Nakada, Hitoshi; Nishiwaki, Isao; Teramoto, Toshio; Yagii, Keikichi; and Niinomi, Masahiro, 4,591,672, Cl. 179-115.5VC.
Teraoka, Masao, to Tochigifujisangyo Kabushikigaisha. Speed change gear shift rod. 4,590,818, Cl. 74-473.00R.
Terasawa, Mutsumi: *See—*
Matsuki, Ikuo; Kamiya, Naoyuki; Ikeda, Toshimitsu; Takagi, Yoshiari; Iizuka, Yoshio; Yamaguchi, Yoshinobu; Funai, Hiroshi; Terasawa, Mutsumi; and Tasaka, Susumu, 4,590,905, Cl. 123-321.000.
Terry Corporation of Connecticut: *See—*
Sirois, Herbert J.; and Wheeler, Kenneth A., 4,590,969, Cl. 137-637.200.
Terumo Corporation: *See—*
Ishizaka, Hideo; and Fujii, Tadashi, 4,592,000, Cl. 364-557.000.
Tesini, Francesco: *See—*
Repetto, Eugenio; Marafini, Fabrizio; and Tesini, Francesco, 4,592,066, Cl. 373-72.000.
Tespa, Brian. Gas fuse. 4,590,962, Cl. 137-498.000.
Testa, Douglas: *See—*
Keyes, Lynne D.; and Testa, Douglas, 4,591,557, Cl. 435-68.000.
Tetenyi, Peter: *See—*
Tyihak, Erno; Mincsovics, Emil; Knoll, Jozsef; Zoltan, Sandor; Lak, Istvan; Tetenyi, Peter; Kalasz, Huba; and Nagy, Janos, 4,591,524, Cl. 428-167.000.
Texas Instruments Incorporated: *See—*
Chatterjee, Pallab K.; and Tasch, Al F., Jr., 4,591,891, Cl. 357-23.120.
Cooper, Michael D., 4,591,741, Cl. 307-456.000.
Haken, Roger A., 4,590,663, Cl. 29-571.000.
Ruszczyk, Vicki V.; and Ting, Youn H., 4,591,820, Cl. 337-107.000.
Ziem, Eva A.; Larrabee, Graydon B.; and Witter, David E., 4,591,409, Cl. 156-605.000.
TGK Company, Limited: *See—*
Hirota, Hisatoshi; Hara, Toyoyuki; and Kawahata, Masaichi, 4,591,677, Cl. 200-83.00J.
Thalmann, Rene A., to Elektro-Apparatebau Olten AG. Photoelectric fiber optic sensing apparatus with illuminated actuator. 4,591,712, Cl. 250-227.000.
Thayer, Edward B., to United States of America, Air Force. Thrust reverser/exhaust nozzle assembly for a gas turbine engine. 4,591,097, Cl. 239-265.290.
Therm-O-Disc, Incorporated: *See—*
Versaw, Douglas P.; and de Geest, Theo, 4,591,822, Cl. 337-380.000.
Thiele, Karl-Heinz: *See—*
Neidig, Arno; Bunk, Klaus; Thiele, Karl-Heinz; Wahl, Georg; and Gobrecht, Jens, 4,591,401, Cl. 156-89.000.
Thieler, Wolfgang: *See—*
Lutz, Dieter; and Thieler, Wolfgang, 4,591,039, Cl. 192-91.00A.
Tholander, Lars H. G., to Aktiebolaget IRO. Yarn storage and feeding device. 4,591,107, Cl. 242-47.010.
Thomas, Gareth J.: *See—*
Broadhurst, Michael J.; Hassall, Cedric H.; and Thomas, Gareth J., 4,591,636, Cl. 536-6.400.
Thompson, Darrell R.: *See—*
Gertzman, Arthur; and Thompson, Darrell R., 4,591,630, Cl. 528-503.000.
Thompson, Hugh A., to Procter & Gamble Company, The. Apertured macroscopically expanded three-dimensional polymeric web exhibiting breatheability and resistance to fluid transmission. 4,591,523, Cl. 428-131.000.
Thompson, Neil G.: *See—*
Birchmeier, John R.; Ruck, George T.; Thompson, Neil G.; and Barlo, Thomas J., 4,591,792, Cl. 324-425.000.
Thomson-CSF: *See—*
Catros, Jean-Yves, 4,591,907, Cl. 358-136.000.
Faillon, Georges; and Epsztein, Bernard, 4,591,799, Cl. 330-45.000.
Huignard, Jean-Pierre, 4,591,241, Cl. 350-358.000.
Thomson Leeds Company Inc.: *See—*
March, David, 4,591,047, Cl. 206-45.180.
Thomson, Timothy M.: *See—*
Mattes, M. Jules; Thomson, Timothy M.; Old, Lloyd J.; and Lloyd, Kenneth O., 4,591,572, Cl. 436-538.000.
Thor, Robert C., to United States of America, Air Force. Programmable LFM signal processor. 4,591,857, Cl. 343-17.2PC.
Thouret, Wolfgang E.; Kaufman, Rudolph; and Kee, Harry, to Duro-Test Corporation. Incandescent lamp with high pressure rare gas filled tungsten-halogen element and transparent thick walled safety envelope. 4,591,752, Cl. 313-25.000.
Tidman, Derek A.: *See—*
Goldstein, Yeshayahu S. A.; and Tidman, Derek A., 4,590,842, Cl. 89-8.000.
Timony, Peter E.: *See—*
Leone-Bay, Andrea; and Timony, Peter E., 4,591,377, Cl. 71-92.000.
Tindyala, Masood A.: *See—*
Fosnacht, Donald R.; and Tindyala, Masood A., 4,591,135, Cl. 266-275.000.
Ting, Youn H.: *See—*
Ruszczyk, Vicki V.; and Ting, Youn H., 4,591,820, Cl. 337-107.000.
Tiomkin, Michael: *See—*
Bar-Nefy, Simcha; and Tiomkin, Michael, 4,590,844, Cl. 89-1.130.
Titan Tool Company: *See—*
McKean, John A., 4,590,826, Cl. 81-53.200.
Toaspern, Jorg; and Grosshauser, Anton. Method for loading and unloading large area transportation means. 4,591,310, Cl. 414-786.000.
Tobias, Lawrence D.: *See—*
Hamilton, James G.; Sullivan, Ann C.; Tobias, Lawrence D.; and Triscari, Joseph, 4,591,594, Cl. 514-339.000.
Tochigifujisangyo Kabushikigaisha: *See—*
Teraoka, Masao, 4,590,818, Cl. 74-473.00R.
Tokano, Takao: *See—*
Kawase, Jiro; and Tokano, Takao, 4,591,498, Cl. 424-70.000.
Tokico Ltd.: *See—*
Ashiba, Masahiro, 4,591,186, Cl. 280-707.000.
Tateoka, Kiyoshi; and Ando, Hiromi, 4,590,845, Cl. 91-369.00A.
Tokiwa, Kinichiro: *See—*
Namekawa, Toshihiko; Kasahara, Masao; Tokiwa, Kinichiro; Inoue, Tohru; and Okamura, Shigeru, 4,592,054, Cl. 371-39.000.
Tokumaru, Hisashi; and Ogino, Shuji, to Minolta Camera Kabushiki Kaisha. Zoom lens system. 4,591,235, Cl. 350-427.000.
Tokumaru, Sennosuke. Heat radiating sheet body. 4,591,701, Cl. 219-543.000.
Tokuyama Soda Kabushiki Kaisha: *See—*
Okabayashi, Minahiro; Yuasa, Shigeki; and Kusumoto, Koshi, 4,591,575, Cl. 501-154.000.
Tokyo Juki Industrial Co., Ltd.: *See—*
Matsubara, Toru; Iimura, Ikuro; Sakuma, Kuniharu; and Goto, Sumio, 4,590,879, Cl. 112-278.000.
Wada, Fumio, 4,590,881, Cl. 112-456.000.
Tokyo Kagaku Kikai Kabushiki Kaisha: *See—*
Takahashi, Susumu; and Horiguchi, Kiwami, 4,591,249, Cl. 354-62.000.
Tokyo Kogaku Kikai Kabushiki Kaisha: *See—*
Kamiya, Minoru; Masuyama, Masayuki; Kitao, Ikuo; Wada, Shinji; and Horiguchi, Kiwami, 4,591,247, Cl. 351-211.000.
Tokyo Petcage Co., Ltd.: *See—*
Sugiura, Masami, 4,590,885, Cl. 119-19.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
Ishii, Takatoshi; and Touyama, Osamu, 4,591,833, Cl. 340-365.00S.
Kawakami, Susumu, 4,591,894, Cl. 357-42.000.
Koike, Hideharu, 4,591,744, Cl. 307-518.000.
Konishi, Satoshi, 4,592,028, Cl. 365-230.000.
Mori, Issei, 4,591,984, Cl. 364-414.000.
Nagano, Katsumi, 4,591,739, Cl. 307-297.000.
O'Brien, Thomas P., 4,592,083, Cl. 378-160.000.
Ohhashi, Masahide, 4,592,007, Cl. 364-784.000.
Sato, Yoshihiro; Sasaki, Kenichi; Miyamoto, Tatsuo; and Tsuzaka, Hideo, 4,591,303, Cl. 408-206.000.
Senzaki, Shigeo; Ikeuchi, Jun-ichiro; Matsui, Toshikazu; and Sawazaki, Norikazu, 4,592,041, Cl. 369-126.000.
Suzuki, Nobuo, 4,591,917, Cl. 358-213.000.
Washizuka, Syoichi; and Matsumura, Sadao, 4,591,994, Cl. 364-500.000.
Yamaguchi, Akira; and Masuda, Eiji, 4,591,801, Cl. 330-261.000.
Yamaura, Mitsuru, 4,591,992, Cl. 364-483.000.
Tokyo Yogyo Kabushiki Kaisha: *See—*
Yoshihara, Tetsuya, 4,591,080, Cl. 222-598.000.
Tolino, Ralph W.; Hopkins, Ronald J.; Congleton, Ray L.; and Popalis, Craig H., to Westinghouse Electric Corp. Core barrel plug. 4,591,068, Cl. 220-240.000.
Tomforde, Johann: *See—*
Gallitzendoerfer, Joseph; Pfeiffer, Peter; Tomforde, Johann; and Hellhake, Ferdinand, 4,591,204, Cl. 296-202.000.
Tomioka, Kentaro: *See—*
Akahane, Shoji; Hirota, Kazuo; and Tomioka, Kentaro, 4,591,384, Cl. 106-35.000.
Tomka, Ivan; and Wittwer, Fritz, to Warner-Lambert Company. Method for molding capsules. 4,591,475, Cl. 264-328.140.
Tomy Kogyo Co., Inc.: *See—*
Ikeda, Masaki, 4,591,346, Cl. 446-437.000.
Tong, George L.: *See—*
Acton, Edward M.; and Tong, George L., 4,591,637, Cl. 536-6.400.
Tools for Bending, Inc.: *See—*
Stange, Ronald R.; Ekren, Dennis J.; and De Martelaere, Gary E., 4,590,779, Cl. 72-294.000.
Toray Industries, Incorporated: *See—*
Higashimura, Toshinobu; and Masuda, Toshio, 4,591,440, Cl. 210-640.000.
Toriumi, Mototada: *See—*
Nishino, Fumio; Onoda, Shigeyoshi; Nomura, Akihiro; Mizutani, Morikazu; Kanemitsu, Shinji; and Toriumi, Mototada, 4,591,258, Cl. 355-3.00R.
Torssell, Krister: *See—*
Axelsson, Carl-Lennart; and Torssell, Krister, 4,591,381, Cl. 75-40.000.
Toshiba Tungaloy Co., Ltd.: *See—*
Sato, Yoshihiro; Sasaki, Kenichi; Miyamoto, Tatsuo; and Tsuzaka, Hideo, 4,591,303, Cl. 408-206.000.
Toste, Edward N., Jr.; and Clifford, Daniel, to R. R. Donnelley & Sons Company. Turntable transfer mechanism for conveyors. 4,591,046, Cl. 198-457.000.
Toudou, Michiharu. Data processing device for inventory control. 4,591,705, Cl. 235-381.000.
Touyama, Osamu: *See—*
Ishii, Takatoshi; and Touyama, Osamu, 4,591,833, Cl. 340-365.00S.
Toyama Chemical Co., Ltd.: *See—*
Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi;

Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, 4,591,558, Cl. 435-68.000.

Toyama, Masamichi: *See—*
Kaneda, Naoya; Toyama, Masamichi; Kozuki, Susumu; Kohtani, Yutaka; and Fujiwara, Akihiro, 4,591,919, Cl. 358-227.000.

Toybox Corporation: *See—*
Kitaoka, Teruhiko; and Matsumoto, Hajime, 4,591,238, Cl. 353-122.000.

Toyo Press Co., Ltd.: *See—*
Uemura, Kichinosuke; and Yamaguchi, Yukio, 4,590,849, Cl. 99-331.000.

Toyo Seikan Kaisha Limited: *See—*
Matsuno, Kenji; and Kuse, Kazuma, 4,591,686, Cl. 219-81.000.

Toyoguchi, Tsutomu; and Watanabe, Yoshiro, to Sony Corporation. Disc player. 4,592,039, Cl. 369-75.200.

Toyooka, Takaaki, to Kawasaki Steel Corporation. Method for forming an electric resistance welded steel pipe. 4,590,781, Cl. 72-181.000.

Toyota Jidosha Kabushiki Kaisha: *See—*
Mifuji, Ken; and Shibata, Norio, 4,590,762, Cl. 60-293.000.
Nakamura, Norihiko; Nomura, Kenichi; and Yoshioka, Mamoru, 4,591,170, Cl. 277-235.00B.
Natsume, Kazuyuki; and Oohashi, Kaoru, 4,591,185, Cl. 280-707.000.
Tsukamoto, Keisuke; Nagase, Masaomi; and Matsuno, Kiyotaka, 4,590,907, Cl. 123-357.000.
Ueda, Masahiro; and Shigeyama, Shigeo, 4,591,035, Cl. 192-3.590.

Toyotomi Kogyo Co., Ltd.: *See—*
Nakamura, Kazuharu; and Nakanishi, Yutaka, 4,591,000, Cl. 169-54.000.

Trad, Inc.: *See—*
Sullivan, Thomas W., 4,591,663, Cl. 179-2.00C.

Transmation, Inc.: *See—*
Muller-Girard, Otto; and Miller, Alan, 4,591,796, Cl. 328-184.000.

Trapani, Giorgio B.: *See—*
Racich, James L.; Schuler, Norman W.; and Trapani, Giorgio B., 4,591,512, Cl. 427-163.000.

Trenkle, Robert W.: *See—*
Mookherjee, Braja D.; Trenkle, Robert W.; Wolff, Robin K.; Boden, Richard M.; and Yoshida, Takao, 4,591,451, Cl. 252-522.00R.

Trimborn, Hermann-Josef, to SMS Hasenclever Maxchinenfabrik GmbH. Screw press. 4,590,787, Cl. 72-454.000.

Triplex Manufacturing Co.: *See—*
Myles, Sam A.; and Katz, Paul C., 4,591,961, Cl. 362-390.000.

Triscari, Joseph: *See—*
Hamilton, James G.; Sullivan, Ann C.; Tobias, Lawrence D.; and Triscari, Joseph, 4,591,594, Cl. 514-339.000.

Trivella, Roberto: *See—*
Mantellina, Calogero; Trivella, Roberto; and Quadraruopolo, Andrea, 4,592,011, Cl. 364-900.000.

Trump, Bruce C.: *See—*
Anderson, Thomas R.; Skolnik, Howard L.; and Trump, Bruce C., 4,591,740, Cl. 307-310.000.

TRW Inc.: *See—*
Brooks, Edward F., 4,591,334, Cl. 432-15.000.
Bucklen, Willard K., 4,591,825, Cl. 340-347.0AD.
Hodge, Malcolm H., 4,591,082, Cl. 225-2.000.
Leibowitz, Joseph D., 4,591,659, Cl. 174-68.500.

TRW United-Carr GmbH: *See—*
Kraus, Willibald, 4,591,119, Cl. 248-74.200.

Trytko, David E., to Ampex Corporation. Encoded dropout compensator system. 4,591,925, Cl. 358-336.000.

Tschoeke, Helmut: *See—*
Hofmann, Eberhard; Pfeifle, Helmut; Schwartz, Reinhard; and Tschoeke, Helmut, 4,590,903, Cl. 123-300.000.

Tschunt, Edgar: *See—*
Rauch, Werner; Schmitt, Guenter; and Tschunt, Edgar, 4,592,080, Cl. 378-19.000.

T'so, Paul O. P.: *See—*
Miller, Paul S.; and T'so, Paul O. P., 4,591,614, Cl. 525-54.110.

Tsuchida, Takayasu: *See—*
Kurahashi, Osamu; Tsuchida, Takayasu; Kawashima, Hiroki; and Enei, Hitoshi, 4,591,562, Cl. 435-108.000.

Tsuda, Hisatsugu: *See—*
Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi; Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, 4,591,558, Cl. 435-68.000.

Tsuda, Yoshio: *See—*
Yokoyama, Kazumasa; Fukaya, Chikara; Tsuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,591,599, Cl. 514-413.000.

Tsudakoma Corp.: *See—*
Sugita, Katsuhiko; and Sainen, Tsutomu, 4,590,972, Cl. 139-435.000.

Tsuge, Itaru, Sachie Tsuge, heirs: *See—*
Takemae, Yoshihiro; Ogawa, Junji; Fujii, Yasuhiro; Nakano, Tomio; Tatematsu, Takeo; Horii, Takashi; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,592,025, Cl. 365-200.000.

Tsuge, Norihisa, deceased: *See—*
Takemae, Yoshihiro; Ogawa, Junji; Fujii, Yasuhiro; Nakano, Tomio; Tatematsu, Takeo; Horii, Takashi; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,592,025, Cl. 365-200.000.

Tsuji, Hidenori: *See—*
Kamitani, Masaaki; and Tsuji, Hidenori, 4,591,416, Cl. 204-35.100.

Tsuji, Shintaro, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for estimating traffic condition value of elevators. 4,591,985, Cl. 364-424.000.

Tsukada, Takami; Ota, Akiho; and Sugiura, Hiroaki, to Yoshino Kogyosho Co., Ltd. Container of polyethylene terephthalate or saturated polyester resin. 4,591,060, Cl. 215-1.00C.

Tsukamoto, Akihito, to Alps Electric Co., Ltd. Phase-shift keying demodulator. 4,592,075, Cl. 375-81.000.

Tsukamoto, Keisuke; Nagase, Masaomi; and Matsuno, Kiyotaka, to Toyota Jidosha Kabushiki Kaisha. Method of adaptively controlling individual cylinder fuel injection quantities in electronically controlled diesel engine and device therefor. 4,590,907, Cl. 123-357.000.

Tsukiji, Yasuhiko: *See—*
Enjo, Sadamichi; Tsukiji, Yasuhiko; Wakatsuki, Goroei; and Noguchi, Toushi, 4,591,017, Cl. 180-205.000.

Tsurumaru, Shinobu: *See—*
Ouchi, Koji; Tsurumaru, Shinobu; Kajiwara, Tadashi; and Kumamoto, Kenichiro, 4,592,093, Cl. 455-4.000.

Tsuzaka, Hideo: *See—*
Sato, Yoshihiro; Sasaki, Kenichi; Miyamoto, Tatsuo; and Tsuzaka, Hideo, 4,591,303, Cl. 408-206.000.

Tucker, Hartwell F.; Tucker, Jeffrey R.; Ross, Dennis; and Knirck, Jeffrey G., to Octa, Inc. Machine for floor maintenance. 4,590,635, Cl. 15-50.00R.

Tucker, Jeffrey R.: *See—*
Tucker, Hartwell F.; Tucker, Jeffrey R.; Ross, Dennis; and Knirck, Jeffrey G., 4,590,635, Cl. 15-50.00R.

Turner, John D.: *See—*
Harrison, Roy; and Turner, John D., 4,590,748, Cl. 53-576.000.

Turner, Terence A.: *See—*
Jenkins, Leonard A.; and Turner, Terence A., 4,591,360, Cl. 8-471.000.

Tuvesson, Par-Ake. Suspension attachment. 4,591,127, Cl. 248-551.000.

Tyihak, Erno; Mincsovics, Emil; Knoll, Jozsef; Zoltan, Sandor; Lak, Istvan; Tetenyi, Peter; Kalasz, Huba; and Nagy, Janos. Chromatographic sheet of layer for pressurized layer chromatographic apparatus. 4,591,524, Cl. 428-167.000.

Uchikata, Yoshio: *See—*
Nozaki, Mineo; Asakura, Osamu; Nagashima, Masasumi; and Uchikata, Yoshio, 4,591,876, Cl. 346-76.0PH.

Ueda, Ikuo; Morino, Daizo; and Takimoto, Koichi, to Fujisawa Pharmaceutical Co., Ltd. Benzhydrylpiperazine derivatives, processes for the preparation thereof and pharmaceutical composition comprising the same. 4,591,590, Cl. 514-252.000.

Ueda, Kazuo, to Shikoku Kakooki Co., Ltd. Packaging machine. 4,590,734, Cl. 53-52.000.

Ueda, Masahiro; and Shigeyama, Shigeo, to Toyota Jidosha Kabushiki Kaisha. Control device for controlling selection of gear ratio in secondary transmission. 4,591,035, Cl. 192-3.590.

Ueda, Nobuo; and Fujita, Masafumi, to Minolta Camera Kabushiki Kaisha. Auto exposure control device for reader-printer. 4,591,264, Cl. 355-68.000.

Uemura, Chikao: *See—*
Yamaguchi, Masafumi; Yamamoto, Akio; and Uemura, Chikao, 4,591,654, Cl. 136-252.000.

Uemura, Kichinosuke; and Yamaguchi, Yukio, to Matsushita Electric Industrial Co., Ltd.; and Toyo Press Co., Ltd. Bread toaster. 4,590,849, Cl. 99-331.000.

Uffner, William E., to Owens-Corning Fiberglas Corporation. Hot-melt adhesive for thermal insulating articles. 4,591,531, Cl. 428-468.000.

Ufkes, Pieter J., to U.S. Philips Corporation. Receiver comprising a search tuning circuit having means for finding the tuning data of a search-tuned transmission after manual tuning. 4,592,094, Cl. 455-164.000.

Ugon, Michel, to Compagnie Internationale pour l'Informatique CII-Honeywell Bull (Societe Anonyme). Device for protecting electronic circuits against electrostatic charges. 4,591,945, Cl. 361-212.000.

Uhde GmbH: *See—*
Buxel, Ludwig M.; Muhlhaus, Ludwig; and Neumann, Ulrich, 4,591,335, Cl. 432-15.000.

Ullrich, Norbert: *See—*
Kohnen, Klaus; and Ullrich, Norbert, 4,590,867, Cl. 110-336.000.

Ulmen, Mathias, to Pfaff Industriemaschinen GmbH. Sewing assembly with a sewing machine movable along the work. 4,590,873, Cl. 112-121.140.

Ultra-Temp Corporation: *See—*
Lueth, Roy C., 4,591,481, Cl. 419-26.000.

Umeda, Takao; Ooishi, Kazuya; Igawa, Tatsuo; Hori, Yasuro; Nagae, Yoshiharu; and Isogai, Masato, to Hitachi, Ltd. Driving method and apparatus for optical printer with liquid-crystal switching element. 4,591,886, Cl. 346-160.000.

Umeno, Masaki; Fukuda, Keiji; and Onoe, Yasumitsu, to Nippon Steel Corporation. Cooling apparatus for thick steel plate. 4,591,133, Cl. 266-114.000.

Undin, Hans: *See—*
Wiener, Hans; and Undin, Hans, 4,590,786, Cl. 72-410.000.

Uni-Cardan Aktiengesellschaft: *See—*
Balken, Jochen; Krude, Werner; and Orain, Michel A., 4,591,212, Cl. 301-105.00R.

Uni-Charm Corporation: *See—*
Suzuki, Migaku; Kobayashi, Toshio; Sasaki, Satoshi; and Imai, Shigeo, 4,591,513, Cl. 427-200.000.

Union Carbide Corporation: *See—*
Chao, Chien C.; and Sherman, John D., 4,591,388, Cl. 127-46.300.
Chiang, Robert L.; Perigard, Raymond G.; and Rabo, Jule A., 4,591,576, Cl. 502-65.000.

Duroyon, Herve D.; and Sene, Jean-Michel M., 4,590,830, Cl. 17-49.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
Hughes, Anthony J.; Saunders, Frances C.; and Shanks, Ian A., 4,591,849, Cl. 340-784.000.
Mabey, Dennis G., 4,591,113, Cl. 244-76.00C.
U.S. Highway Products, Inc.: *See—*
Block, Harvey P., 4,590,694, Cl. 37-233.000.
United States of America
Air Force: *See—*
Kuperman, Gilbert G.; and Wallquist, Donald L., 4,591,998, Cl. 364-521.000.
Masak, Raymond J., 4,591,856, Cl. 343-17.10R.
Nissen, Stanley M.; Grobicki, Chris J.; and Kaupinis, William M., 4,591,977, Cl. 364-200.000.
Thayer, Edward B., 4,591,097, Cl. 239-265.290.
Thor, Robert C., 4,591,857, Cl. 343-17.2PC.
Webber, Douglas G.; and Schenck, George C., 4,591,976, Cl. 364-200.000.
Army: *See—*
F'Geppert, Erwin, 4,590,813, Cl. 74-64.000.
Grabarek, Chester; and Collis, Dave L., 4,590,862, Cl. 102-522.000.
Mongeon, Robert J.; and Henschke, Robert W., 4,592,058, Cl. 372-32.000.
Verma, Pritam S., 4,591,573, Cl. 436-542.000.
Energy: *See—*
Amer, Nabil M., 4,591,718, Cl. 250-339.000.
Cohen, Mark E.; and Whiting, Carlton D., 4,591,478, Cl. 376-253.000.
Pawloski, Gayle A., 4,592,082, Cl. 378-075.000.
Zaromb, Solomon; Otagawa, Takaaki; and Stetter, Joseph R., 4,591,414, Cl. 204-1.00T.
National Aeronautics and Space Administration: *See—*
Hollow, Richard H., 4,591,772, Cl. 318-632.000.
Jarvis, Michael R.; and Fulton, Donald S., 4,591,838, Cl. 340-605.000.
Navy: *See—*
Bocker, Richard P.; Clayton, Stanley R.; and Bromley, Keith, 4,592,004, Cl. 364-713.000.
DeCarlo, Joseph D., 4,591,115, Cl. 244-135.00C.
Elton, Raymond C., 4,592,056, Cl. 372-5.000.
Koo, Kee P.; and Sigel, George H., Jr., 4,591,786, Cl. 324-244.000.
Panayappan, Ramanathan; and Cooper, John C., 4,591,510, Cl. 427-125.000.
Peebles, Leighton H., Jr., 4,591,511, Cl. 427-142.000.
Sternberg, Robert L.; and Anderson, Warren A., 4,591,864, Cl. 343-754.000.
U.S. Philips Corporation: *See—*
Bakker, Gijsbertus; and Rorije, Gerhardus J., 4,591,757, Cl. 313-461.000.
Canal, Yves S., 4,591,865, Cl. 343-767.000.
deBoer, Eeltje; and Huijser, Arie, 4,591,898, Cl. 358-36.000.
Killat, Ulrich; Riekmann, Dieter; and Stecher, Rolf, 4,592,049, Cl. 370-87.000.
Lamboo, Theodorus F., 4,591,958, Cl. 362-219.000.
Miletic, Igor, 4,591,813, Cl. 333-117.000.
Ohsaki, Kiyoshi, 4,592,040, Cl. 369-77.100.
Schofield, John, 4,591,815, Cl. 333-195.000.
Stoelinga, Franciscus A., 4,591,753, Cl. 313-146.000.
Ufkes, Pieter J., 4,592,094, Cl. 455-164.000.
van Tuijl, Adrianus J. M., 4,591,804, Cl. 330-288.000.
United Technologies Corporation: *See—*
Fischer, William C.; Wright, Stuart C.; and Verzella, David J., 4,592,055, Cl. 371-62.000.
Fradenburgh, Evan A.; Kiely, Edmond F.; and Miller, Gordon G., 4,591,400, Cl. 156-80.000.
Kromrey, Robert V., 4,590,860, Cl. 102-289.000.
Kunz, Harold R., 4,591,538, Cl. 429-16.000.
Lohmann, Robert P.; and Jeroszko, Ronald A., 4,590,769, Cl. 60-752.000.
McCorkle, Gary A., 4,591,795, Cl. 328-5.000.
Shattuck, Alan B.; and Couch, Robert P., 4,591,794, Cl. 324-464.000.
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Kurzweg, Ulrich H., 4,590,993, Cl. 165-104.310.
University of Glasgow, The University Court of the: *See—*
Biddlecombe, William H.; Elder, Hugh Y.; and Nicholson, W. A. Patrick, 4,591,722, Cl. 250-443.100.
University of Montana, The: *See—*
Watson, Kenneth F., 4,591,564, Cl. 435-194.000.
University of Southern California: *See—*
DeQuattro, Vincent; and Kobayashi, Kiyoshi, 4,591,551, Cl. 435-15.000.
University of Southern Mississippi: *See—*
Mathias, Lon J., 4,591,625, Cl. 526-265.000.
University of Tennessee Research Corporation: *See—*
Laughter, Joseph S., 4,591,111, Cl. 244-75.00R.
Upton, Gene; and Brown, Dennis, to Kart Guard Internationale, Inc. Shopping cart anti-theft apparatus. 4,591,175, Cl. 280-33.99C.
Urabe, Hitoshi; Matsumoto, Masayuki; Kudo, Hisashi; and Shimazaki, Osamu, to Fuji Photo Film Co., Ltd. Picture image input/output system. 4,591,904, Cl. 358-75.000.
Urabe, Hitoshi; and Kimura, Hideaki, to Fuji Photo Film Co., Ltd. Method and apparatus for intensifying sharpness of picture images. 4,591,923, Cl. 358-284.000.
Urbach, Hansjorg; Henning, Rainer; and Becker, Reinhard, to Hoechst Aktiengesellschaft. Derivatives of 2-azabicyclo[3.1.0]hexane-3-carboxylic acid, and hypotensive use thereof. 4,591,598, Cl. 514-412.000.
Urech, Werner, to Opprecht, Paul. Electrical resistance-pressure welding process for welding parts of workpieces made of aluminum materials and an apparatus and electrode therefor. 4,591,687, Cl. 219-93.000.
Uriuhara, Makoto; and Kuroyanagi, Junzo, to Isuzu Motors, Ltd. Fuel control mechanism in internal combustion engine. 4,590,906, Cl. 123-339.000.
Uriuhara, Makoto: *See—*
Asagi, Yasuyoshi; Ogawa, Noriaki; Kasai, Hitoshi; Hattori, Toshihiro; Ishihara, Masaki; and Uriuhara, Makoto, 4,591,038, Cl. 192-0.073.
Urmston, Robert: *See—*
Abatti, C. Alex; and Urmston, Robert, 4,590,739, Cl. 53-391.000.
Uscategui, Gabriel J.: *See—*
Prentice, John S.; and Uscategui, Gabriel J., 4,590,664, Cl. 29-571.000.
USM Corporation: *See—*
Moran, Michael J.; and Lohr, Joseph B., 4,591,012, Cl. 177-145.000.
Uwai, Toshihiro: *See—*
Sato, Akihiro; Tachibana, Masami; Shimizu, Hiroshi; and Uwai, Toshihiro, 4,591,577, Cl. 502-105.000.
V M E I "Lenin" Quartal Darvenitza: *See—*
Kassabov, Nikola K., 4,591,981, Cl. 364-200.000.
Vachhani, Vasantrai A., to Magnetic Controls Co. Electrical connector. 4,591,223, Cl. 339-97.00R.
Vachon, Reginald I. Apparatus and method for determining stress and strain in pipes, pressure vessels, structural members and other deformable bodies. 4,591,996, Cl. 364-508.000.
Vadasz Fekete, Amnon M. Piston with composite retention valve. 4,591,315, Cl. 417-259.000.
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Vahs, Wilhelm: *See—*
Fritsche, Karl; and Vahs, Wilhelm, 4,590,639, Cl. 16-79.000.
Valashinas, James W.: *See—*
Buonomo, Joseph P.; Houghtalen, Steven R.; Losinger, Raymond E.; and Valashinas, James W., 4,591,982, Cl. 364-200.000.
Valeo: *See—*
Valier, Carlo, 4,591,041, Cl. 192-107.00R.
Valier, Carlo, to Valeo. Clutch friction disk comprising balancing means. 4,591,041, Cl. 192-107.00R.
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Sciambi, Orlando L.; and Valtri, Frank J., 4,591,022, Cl. 182-47.000.
Van Achter, Pieter-Paul. Method for treating copper and for using the thus-treated copper. 4,591,394, Cl. 148-11.50Q.
Vanamatic Company: *See—*
Wiltsie, Jeffrey S., 4,590,827, Cl. 82-11.000.
van Amerongen, Evert, to SKF Industrial Trading & Development Company B.V. Method of constructing an assembly with a roller bearing to avoid fretting corrosion. 4,590,657, Cl. 29-458.000.
Vance, James F., Sr.: *See—*
Segura, Joseph W.; and Vance, James F., Sr., 4,590,938, Cl. 128-328.000.
Vanderheiden, Gregg: *See—*
Gunderson, Jon; Kelso, David P.; and Vanderheiden, Gregg, 4,591,841, Cl. 340-707.000.
Vanderhoof, John R. Method and apparatus for a game. 4,591,161, Cl. 273-272.000.
van der Lely, Cornelis. Tractor. 4,591,018, Cl. 180-260.000.
van der Smissen, Carl E.; and Ernst, Rainer, to Dragerwerk AG. Igniting mixture for chemical oxygen generators. 4,591,399, Cl. 149-2.000.
Van Dine, Gilbert A.: *See—*
Beckner, Mark W.; Davis, James A.; Gausmann, Eric J.; Hiller, Thomas L.; Olson, Philip D.; and Van Dine, Gilbert A., 4,592,048, Cl. 370-60.000.
Van Exel, Gary A.; Perez, Victor; and Marmol, Alfredo B., to Rain Bird Consumer Products Mfg. Corp. Quick connect coupling. 4,591,192, Cl. 285-83.000.
van Helden, Robert: *See—*
Scholes, Gary; and van Helden, Robert, 4,591,457, Cl. 260-239.00A.
van Heteren, Jan: *See—*
Bodor, Janos; Heslinga, Lammert; van Heteren, Jan; and de Vries, Bartholomeus, 4,591,507, Cl. 426-604.000.
Van Horn, Samuel L. Method and apparatus for improving electroplating and painting racks. 4,591,420, Cl. 204-297.00W.
Van Reijmersdal, Joseph J. A., to De Vlamboog B.V. Welding electrode holder. 4,591,690, Cl. 219-138.000.
van Tuijl, Adrianus J. M., to U.S. Philips Corporation. Cascode current-source arrangement having dual current paths. 4,591,804, Cl. 330-288.000.
Varian Associates, Inc.: *See—*
Eaton, Steven G.; and Siddall, Graham J., 4,592,081, Cl. 378-34.000.
Varney, Gordon. Infant rocking device. 4,590,631, Cl. 5-101.000.
Vasseur, Andre , to Gerin, Merlin. Mechanical fastening device for assembling electrical equipment modules. 4,591,228, Cl. 339-198.00H.
Vaughan, Eric V.: *See—*
Bryant-Jeffries, Keith C.; Golledge, Ian; Pike, John V.; and Vaughan, Eric V., 4,591,120, Cl. 248-179.000.

Vaughn, John. High torque fastener and driving tool. 4,590,825, Cl. 81-451.000.

VEB Kombinat Oberbekleidung Berlin Stammbetrieb VEB Herrenbekleidung Fortschritt: *See—*
Mencke, Helmut; Gruner, Hans-Jurgen; Oertmann, Peter; Nerlich, Horst; and Grabasch, Heinz, 4,590,876, Cl. 112-262.300.

Veillette, Norman T.: *See—*
Arbree, Roberta R.; Degulis, David C.; Goodwin, Henry W.; and Veillette, Norman T., 4,591,887, Cl. 346-200.000.

Verbert, Karel H.: *See—*
De Brouckere, Lucien C.; Caers, Ludo M. J.; and Verbert, Karel H., 4,591,221, Cl. 339-19.000.

Verma, Pritam S., to United States of America, Army. Sensitive radioimmunoassay using antibody to L-hyoscyamine. 4,591,573, Cl. 436-542.000.

Versaw, Douglas P.; and de Geest, Theo, to Therm-O-Disc, Incorporated. Bimetal thermostat with head collector. 4,591,822, Cl. 337-380.000.

Verzella, David J.: *See—*
Fischer, William C.; Wright, Stuart C.; and Verzella, David J., 4,592,055, Cl. 371-62.000.

Vetere, Alessandro: *See—*
Gazzi, Luigi; D'Ambra, Roberto; Di Cintio, Roberto; Rescalli, Carlo; and Vetere, Alessandro, 4,591,370, Cl. 62-17.000.

Vettiger, Peter: *See—*
Bohlen, Harald; Bretscher, Erwin; Engelke, Helmut; Nehmiz, Peter; Vettiger, Peter; and Greschner, Johann, 4,591,540, Cl. 430-22.000.

Vickers, Timothy J.; and Lloyd, Darrell W., to Bernhardt Industries. Attaching device for modular furniture. 4,591,289, Cl. 403-322.000.

Victor Company of Japan, Limited: *See—*
Kouda, Kazuo, 4,591,935, Cl. 360-96.300.
Miyasho, Yasuo, 4,592,035, Cl. 369-32.000.
Owaki, Isao; and Saito, Susumu, 4,591,927, Cl. 360-15.000.

Vincent, James P.: *See—*
Curtis, Donald E.; Vincent, James P.; and Weidmann, Mary E., 4,591,840, Cl. 340-706.000.

Vita-Stat Medical Services, Inc.: *See—*
Wiegman, Douglas C., 4,592,018, Cl. 365-63.000.

Vitro Tec Fideicomiso: *See—*
Figueroa, David S.; and Heredia, Jorge A. P., 4,590,966, Cl. 137-596.170.

Voelskow, Hartmut: *See—*
Fischer, Edgar; and Voelskow, Hartmut, 4,591,639, Cl. 536-114.000.

Voest-Alpine Aktiengesellschaft: *See—*
Droscher, Bernhard; Schetina, Otto; Wrulich, Herwig; and Zitz, Alfred, 4,591,209, Cl. 299-1.000.
Kollenz, Erich, 4,591,325, Cl. 425-233.000.
Smejkal, Hellmuth; Rockenschaub, Walter; and Fohler, Johann, 4,591,134, Cl. 266-135.000.

Volk, Seymour A., to Emmons, Charley Carl; and Emmons, Barry L., part interest to each. Trapping apparatus. 4,590,704, Cl. 43-61.000.

Volpi AG: *See—*
Neuenschwander, Ernst, 4,591,732, Cl. 307-140.000.

vom Stein, Karl: *See—*
Vossieck, Paul; and vom Stein, Karl, 4,591,167, Cl. 277-88.000.

Von-Meyer, Claas, to Anker Labelers Corp. Pail labeling machine. 4,591,403, Cl. 156-364.000.

von Resch, Julius M., to Gretsch-Unitas GmbH Baubeschlage. Releasable panel assembly for window frame or the like. 4,590,707, Cl. 49-130.000.

Vork, William D.: *See—*
Snyder, Irving F.; Vork, William D.; and Itzin, Michael, 4,591,096, Cl. 239-216.000.

Vossieck, Paul; and vom Stein, Karl, to Goetze AG. Slide ring seal with pre-contoured bellows. 4,591,167, Cl. 277-88.000.

Vranizan, John M.: *See—*
Kintz, Arthur H.; and Vranizan, John M., 4,590,978, Cl. 144-174.000.

Vynalam, Ltd.: *See—*
Rosenberg, David, 4,590,689, Cl. 36-3.00B.

W. A. Cleary Chemical Corporation: *See—*
Sartoretto, Paul, 4,591,375, Cl. 71-28.000.

W. C. Heraeus GmbH: *See—*
Aldinger, Fritz; Keilberth, Richard; and Werdecker, Waltraud, 4,591,537, Cl. 428-698.000.

W. R. Grace & Co.: *See—*
Jenkins, Robert F.; and Siadat, Bahram, 4,591,611, Cl. 524-64.000.
Kang, Uan G.; Bush, Richard W.; Ketley, Arthur D.; and Ferrin, Clifford A., Jr., 4,591,522, Cl. 428-419.000.
Kim, Gwan; and Ernest, Michael V., 4,591,580, Cl. 502-303.000.

Wada, Chuzoh, to Matsushita Electric Industrial Co., Ltd. Control device of a combustion apparatus. 4,591,332, Cl. 431-62.000.

Wada, Fumio, to Tokyo Juki Industrial Co., Ltd. Sewing machine and method of sewing patterns. 4,590,881, Cl. 112-456.000.

Wada, Shinji: *See—*
Kamiya, Minoru; Masuyama, Masayuki; Kitao, Ikuo; Wada, Shinji; and Horiguchi, Kiwami, 4,591,247, Cl. 351-211.000.

Wade, Donald A.; Wagner, Eric M.; Krantz, Lawrence L.; and Goodman, R. W., to Data General Corporation. Data processing system having dual processors. 4,591,975, Cl. 364-200.000.

Wade, James J., to Riker Laboratories, Inc. Triazolo[1,5-c]pyrimidines and bronchodilation use thereof. 4,591,588, Cl. 514-222.000.

Wadensten, Theodore S. Vibration dampening apparatus for motor actuated eccentric forces. 4,590,814, Cl. 74-87.000.

Wadie, Brian J.: *See—*
Webster, George A.; and Wadie, Brian J., 4,590,971, Cl. 138-149.000.

Wagner, Daniel B.; and Dasher, Luther W., to Becton Dickinson & Company. Homogeneous fluorescent triiodothyronine uptake test. 4,591,569, Cl. 436-500.000.

Wagner, Eric M.: *See—*
Wade, Donald A.; Wagner, Eric M.; Krantz, Lawrence L.; and Goodman, R. W., 4,591,975, Cl. 364-200.000.

Wagner, William R.; and Feight, Robert A., to Rockwell International Corporation. Wall structure for rocket nozzle extension. 4,591,534, Cl. 428-593.000.

Wahl, Georg: *See—*
Neidig, Arno; Bunk, Klaus; Thiele, Karl-Heinz; Wahl, Georg; and Gobrecht, Jens, 4,591,401, Cl. 156-89.000.

Wakabayashi, Hideo: *See—*
Hakamada, Kunio; Ishiguro, Satoshi; Wakabayashi, Hideo; and Ogawa, Kiyoshi, 4,591,914, Cl. 358-190.000.

Wakatsuki, Goroei: *See—*
Enjo, Sadamichi; Tsukiji, Yasuhiko; Wakatsuki, Goroei; and Noguchi, Toushi, 4,591,017, Cl. 180-205.000.

Waki, Osamu: *See—*
Kawamura, Toshihide; Kashiwabara, Hoichiro; Waki, Osamu; and Sakai, Hiro, 4,591,954, Cl. 362-61.000.

Waku, Toshihiko: *See—*
Watari, Masao; Akabane, Makoto; Nishioka, Hisao; and Waku, Toshihiko, 4,592,085, Cl. 381-43.000.

Walker, Stanley F., to Manville Service Corporation. Heat insulating tarpaulin. 4,590,714, Cl. 52-3.000.

Wallis, Bernard J. Die clamp. 4,590,788, Cl. 72-481.000.

Wallquist, Donald L.: *See—*
Kuperman, Gilbert G.; and Wallquist, Donald L., 4,591,998, Cl. 364-521.000.

Walston, Holly: *See—*
Spease, Arthur L.; and Walston, Holly, 4,590,819, Cl. 74-501.00R.

Walter, Carl W.; and Woodworth, John L., to Kidde, Inc. Hermetically sealed two-component mixing system. 4,591,049, Cl. 206-222.000.

Walter, Lothar: *See—*
Olschewski, Armin; Brandenstein, Manfred; Walter, Lothar; and Ernst, Horst M., 4,591,352, Cl. 474-95.000.

Wanasz, Michael J.; Harrison, Stanley N.; and McBride, Paul B., Jr. Electric generator system for portable floodlighting equipment. 4,591,763, Cl. 315-304.000.

Wannenwetsch, Peter, to Robert Bosch GmbH. Fuel injection apparatus. 4,590,904, Cl. 123-300.000.

Warner-Lambert Company: *See—*
Tomka, Ivan; and Wittwer, Fritz, 4,591,475, Cl. 264-328.140.

Washizuka, Syoichi; and Matsumura, Sadao, to Tokyo Shibaura Denki Kabushiki Kaisha. Method and apparatus for controlling shape of single crystal. 4,591,994, Cl. 364-500.000.

Waskiewicz, John J.: *See—*
Bailey, Francis V.; and Waskiewicz, John J., 4,590,987, Cl. 164-457.000.

Watanabe, Fumio: *See—*
Mizuguchi, Yoshihiko; and Watanabe, Fumio, 4,591,866, Cl. 343-781.00P.

Watanabe, Kazuhide: *See—*
Yoshinaga, Toru; Sakakibara, Yasuyuki; Abe, Seiko; Watanabe, Kazuhide; and Natsuyama, Yukihiro, 4,590,908, Cl. 123-357.000.

Watanabe, Kyoji, to NEC Corporation. Burst signal transmission system. 4,592,073, Cl. 375-60.000.

Watanabe, Robert S. Arthroscope-video camera assembly. 4,590,923, Cl. 128-6.000.

Watanabe, Yasuhiko: *See—*
Kawaguchi, Hideo; Ando, Hideo; and Watanabe, Yasuhiko, 4,590,870, Cl. 112-70.000.

Watanabe, Yoshiro: *See—*
Toyoguchi, Tsutomu; and Watanabe, Yoshiro, 4,592,039, Cl. 369-75.200.

Watari, Masao; Akabane, Makoto; Nishioka, Hisao; and Waku, Toshihiko, to Sony Corporation. Speech-recognition method and apparatus for recognizing phonemes in a voice signal. 4,592,085, Cl. 381-43.000.

Watari, Masao; and Sakoe, Hiroaki, to Nippon Electric Co., Ltd. Continuous speech recognition system. 4,592,086, Cl. 381-43.000.

Waters, James D., Jr.: *See—*
Brown, Ronald D.; and Waters, James D., Jr., 4,591,689, Cl. 219-124.340.

Watson, Kenneth F., to University of Montana, The. Transferase enzymes which modify the 3'-termini of ribonucleic acid and methods. 4,591,564, Cl. 435-194.000.

Weathermate Marine Manufacturing, Inc.: *See—*
Pandell, Nestor W., 4,590,715, Cl. 52-3.000.

Webasto-Werk W. Baier GmbH & Co.: *See—*
Mosig, Ernst, 4,590,888, Cl. 122-149.000.

Webber, Douglas G.; and Schenck, George C., to United States of America, Air Force. Multiple task oriented processor. 4,591,976, Cl. 364-200.000.

Webco Industrial Rubber Limited: *See—*
Webster, George A.; and Wadie, Brian J., 4,590,971, Cl. 138-149.000.

Weber, Andre , to Kuhn S.A. Cast brake crown rotor and method of producing same. 4,590,981, Cl. 164-112.000.

Weber, Kent, to Sundstrand Corporation. Hydraulic power supply system utilizing a solid propellant gas generator. 4,591,314, Cl. 417-47.000.

Webster, George A.; and Wadie, Brian J., to Webco Industrial Rubber Limited. Insulated pipeline. 4,590,971, Cl. 138-149.000.

Wedel, John O.: *See—*
Parkhurst, Ross A.; and Wedel, John O., 4,591,862, Cl. 343-427.000.

Wedl, Peter: *See—*
Worschech, Kurt; Wedl, Peter; and Loffelholz, Frido, 4,591,452, Cl. 252-400.00A.

Weedon, Gene C.: *See—*
Lofquist, Robert A.; Weedon, Gene C.; and Cole, Charles J., 4,591,473, Cl. 264-129.000.

Wehrenberg, Thomas M.: *See—*
McGarry, Charles N.; and Wehrenberg, Thomas M., 4,591,383, Cl. 75-93.00R.

Wehrmann, Gerhard, to Georg Fischer Aktiengesellschaft. Vibration device for the removal of burrs from workpieces constructed as foundry cores or the like. 4,590,636, Cl. 15-94.000.

Weiblen, Richard; and Jenny, Werner, to TBT Tiefbohrteckhik GmbH & Co. KG. Deep-drilling tool. 4,591,300, Cl. 408-59.000.

Weidmann, Mary E.: *See—*
Curtis, Donald E.; Vincent, James P.; and Weidmann, Mary E., 4,591,840, Cl. 340-706.000.

Weintraub, Marvin H.: *See—*
Rosky, Leon; Anslow, Gabriel T.; Spaniola, Daniel F.; and Weintraub, Marvin H., 4,590,914, Cl. 123-557.000.

Weirich, Andreas H.: *See—*
Chow, Peter E.; Weirich, Andreas H.; and Strawczynski, Leo, 4,592,070, Cl. 375-27.000.

Weiser Design, Ltd.: *See—*
Weiser, Georgiann, 4,590,624, Cl. 2-114.000.

Weiser, Georgiann, to Weiser Design, Ltd. Birthing gown. 4,590,624, Cl. 2-114.000.

Weissenberger, Helmuth: *See—*
Schraut, Alfred; and Weissenberger, Helmuth, 4,591,040, Cl. 192-106.200.

Weissman, Neal V., to Colgate-Palmolive Company. Dripless pouring cap. 4,591,078, Cl. 222-517.000.

Weitzberg, Abraham, to NUS Corporation. Boiling water reactor fuel bundle. 4,591,479, Cl. 376-349.000.

Wenglarz, Richard A., to Electric Power Research Institute. Particle laden fluid powered gas turbine and like apparatus and method of operation. 4,591,312, Cl. 415-121.00R.

Wenner, Hans. Coin machine for a newspaper, magazine, food or other item dispensing apparatus. 4,591,042, Cl. 194-225.000.

Wentzel, Robert J.; and Tallman, Walter E., to Burroughs Corporation. Pivot point sheet feeder. 4,591,141, Cl. 271-127.000.

Wenzel, Werner, to Nordischer Maschinenbau Rud. Baader GmbH & Co. KG. Method and device for aligning fish. 4,591,045, Cl. 198-456.000.

Werdecker, Waltraud: *See—*
Aldinger, Fritz; Keilberth, Richard; and Werdecker, Waltraud, 4,591,537, Cl. 428-698.000.

West, Paul R.; and Griffing, Bruce F., to General Electric Company. Spin castable resist composition and use. 4,591,546, Cl. 430-270.000.

Westermeier, Heinz, to Siemens Aktiengesellschaft. Laser diode with simplified adjustment during assembly. 4,592,059, Cl. 372-36.000.

Westerteicher, Wolfgang; and Schurfeld, Horst, to Gildemeister-Devlieg System-Werkzeuge GmbH. Peripheral device for machine tools. 4,591,306, Cl. 409-179.000.

Westerwaelder Eisenwerk Gerhard GmbH: *See—*
Gerhard, Helmut, 4,591,064, Cl. 220-1.500.

Westinghouse Electric Corp.: *See—*
Cooper, Frank W., Jr.; Epperson, Thomas M.; Calhoun, Gregory L.; and Kucherer, Harvey D., 4,590,991, Cl. 165-69.000.
Harrold, Ronald T., 4,590,803, Cl. 73-590.000.
Havoic-Conroy, Stephanie M., 4,590,671, Cl. 29-723.000.
Mackenzie, Raymond W.; and Heinrich, Theodore M., 4,591,810, Cl. 332-9.00R.
Peterson, Ray D., 4,591,413, Cl. 202-173.00C.
Sun, Shan C.; and McGivern, James P., 4,591,940, Cl. 361-68.000.
Tolino, Ralph W.; Hopkins, Ronald J.; Congleton, Ray L.; and Popalis, Craig H., 4,591,068, Cl. 220-240.000.

Westley, John: *See—*
Liu, Chao-Min; and Westley, John, 4,591,559, Cl. 435-76.000.

Westmoreland, Raymond R.: *See—*
Fisher, Brian; and Westmoreland, Raymond R., 4,591,019, Cl. 180-275.000.

Weyer, Paul P. Ball screw actuator. 4,590,816, Cl. 74-424.8NA.

Wheeler, Kenneth A.: *See—*
Sirois, Herbert J.; and Wheeler, Kenneth A., 4,590,969, Cl. 137-637.200.

Whikehart, J. William, to Rockwell International Corporation. Simplified hardware implementation of a digital IF translator. 4,592,074, Cl. 375-75.000.

Whipple, Rodger E.; and Curtis, Richard H., to Overly, Inc. Web dryer with variable ventilation rate. 4,591,517, Cl. 427-378.000.

Whirlpool Corporation: *See—*
Stewart, Bruce E., Sr.; and Lyman, John B., 4,591,369, Cl. 55-374.000.

White, Gilbert T. Snow slider replacement system and method. 4,591,174, Cl. 280-28.000.

Whiting, Carlton D.: *See—*
Cohen, Mark E.; and Whiting, Carlton D., 4,591,478, Cl. 376-253.000.

Whiting, Howard: *See—*
Crampton, John R.; and Whiting, Howard, 4,591,581, Cl. 502-407.000.

Whitlaw, Keith J., to LeaRonal, Inc. Plating baths and methods for electro-deposition of gold or gold alloys. 4,591,415, Cl. 204-15.000.

Wiechert, Rudolf: *See—*
Kerb, Ulrich; Sauer, Gerhard; Wiechert, Rudolf; Henderson, David; Nishino, Yukishige; and Beier, Sybille, 4,591,585, Cl. 514-177.000.

Wiegman, Douglas C., to Vita-Stat Medical Services, Inc. Removable RAM package for ambulatory medical monitor. 4,592,018, Cl. 365-63.000.

Wieland, Rolf H.; Brodbeck, Howard D.; Paston, Alan J.; and Maucere, Casper C., to MG Industries. Tube expander and freezer and method of using same. 4,590,656, Cl. 29-450.000.

Wiener, Hans; and Undin, Hans, to C. A. Weidmuller GmbH & Co. Cable shoe tongs with a stop means. 4,590,786, Cl. 72-410.000.

Wightman, Lawrance W. Battery warmer. 4,591,692, Cl. 219-209.000.

Wilkerson, Gary B. Ankle-sprain edema-control boot assembly. 4,590,932, Cl. 128-166.000.

Wilkinson, Jack A., to Milliken Research Corporation. Loom and method of weaving. 4,590,973, Cl. 139-443.000.

Willard, Henry G.; and Anderson, Thomas E., to General Electric Company. Current sensing transformer assembly. 4,591,942, Cl. 361-97.000.

Willard, Virginia D., to Austin, Lindsay E., a part interest. Speed gauging indicator. 4,592,001, Cl. 364-565.000.

Willi Studer AG: *See—*
Gaskell, Philip S.; Lagadec, Roger; and McNally, Guy W. W., 4,591,926, Cl. 360-13.000.

Wm. T. Burnett & Co., Inc.: *See—*
Buchanan, Michael S.; and Davis, Gregory B., 4,591,469, Cl. 264-45.300.

Williams, Gareth F., to AT&T Bell Laboratories. Wavelength division multiplexing optical communications systems. 4,592,043, Cl. 370-3.000.

Williams, John W., to Boeing Company, The. Marine transfer device. 4,590,634, Cl. 14-71.100.

Williams, Theodore F.: *See—*
McCann, James D.; Piatt, Michael J.; and Williams, Theodore F., 4,591,873, Cl. 346-75.000.

Willingham, John H. Cooker. 4,590,848, Cl. 99-339.000.

Willis, Donald H.: *See—*
Fling, Russell T.; and Willis, Donald H., 4,591,832, Cl. 340-347.0DA.

Wilson, Michael E.: *See—*
DePasquale, Ralph J.; and Wilson, Michael E., 4,591,652, Cl. 556-419.000.

Wiltsie, Jeffrey S., to Vanamatic Company. Recess tool holder. 4,590,827, Cl. 82-11.000.

Wilverly Mansions I.B.V.: *See—*
Gelbard, Edward, 4,591,354, Cl. 493-439.000.

Windmoller & Holscher: *See—*
Eckelt, Ulrich, 4,590,832, Cl. 83-100.000.

Wirstlin, Arthur N., to Fawn Engineering Corp. Article dispenser adjustable for different size articles. 4,591,070, Cl. 221-129.000.

Wirts, Harold L.; and Corner, Horace B., to Mossberg Industries. Wire storing and dereeling apparatus. 4,591,110, Cl. 242-129.800.

Wisconsin Alumni Research Foundation: *See—*
Gunderson, Jon; Kelso, David P.; and Vanderheiden, Gregg, 4,591,841, Cl. 340-707.000.

Wise, Daniel J., to Combibloc, Inc. Aseptic container with tamper-resistant spout and blank therefor. 4,591,091, Cl. 229-17.00G.

Wissmann, Michael; and Schliemann, Harald, to Stihl, Andreas. Two-stroke engine. 4,590,896, Cl. 123-73.00R.

Witter, David E.: *See—*
Ziem, Eva A.; Larrabee, Graydon B.; and Witter, David E., 4,591,409, Cl. 156-605.000.

Wittwer, Fritz: *See—*
Tomka, Ivan; and Wittwer, Fritz, 4,591,475, Cl. 264-328.140.

Wohner, Hans J.; Pappmann, Wilfried; and Diemer, Peter, to Krupp-Koppers GmbH. Method of subsequent treatment of sulfur gas from waste pyrolysis. 4,591,366, Cl. 55-20.000.

Wolfe, Robert A.; and Gleisner, Donald, to All American Inc. Shoulder, chest and neck protecting device. 4,590,622, Cl. 2-2.000.

Wolff, Robin K.: *See—*
Mookherjee, Braja D.; Trenkle, Robert W.; Wolff, Robin K.; Boden, Richard M.; and Yoshida, Takao, 4,591,451, Cl. 252-522.00R.

Wolfges, Hans, to Mannesmann Rexroth GmbH. Pilot valve operated pressure reducing valve. 4,590,968, Cl. 137-625.640.

Wollscheid, Dieter, to Siemens Aktiengesellschaft. Memory-programmable controller. 4,592,010, Cl. 364-900.000.

Wong, Jacob Y., to Andors Analyzers Incorporated. Oxygen analysis employing absorption spectroscopy. 4,591,721, Cl. 250-373.000.

Wood, Francis W. Recliner wheelchair. 4,591,182, Cl. 280-647.000.

Woodruff, Robert L. Level and accessory mounting attachment for cameras. 4,591,250, Cl. 354-76.000.

Woods Reef Mines Ltd.: *See—*
Andrews, John R.; Stewart, Philip S. B.; and Hurst, George T., 4,591,103, Cl. 241-4.000.

Woods, Walter: *See—*
Nahra, John E.; and Woods, Walter, 4,591,463, Cl. 261-116.000.

Woodworth, John L.: *See*—
Walter, Carl W.; and Woodworth, John L., 4,591,049, Cl. 206-222.000.
Wooster Brush Company, The: *See*—
Marino, Frank, 4,590,637, Cl. 15-160.000.
Wordfit Limited: *See*—
Bloom, Phillip J.; and Marshall, Garth D., 4,591,928, Cl. 360-13.000.
Worschech, Kurt; Wedl, Peter; and Loffelholz, Frido, to Neynaber Chemie GmbH. Solid multicomponent mixtures of stabilizers and lubricants for halogenated polymers and the preparation thereof. 4,591,452, Cl. 252-400.00A.
Wright, Stuart C.: *See*—
Fischer, William C.; Wright, Stuart C.; and Verzella, David J., 4,592,055, Cl. 371-62.000.
Wrulich, Herwig: *See*—
Droscher, Bernhard; Schetina, Otto; Wrulich, Herwig; and Zitz, Alfred, 4,591,209, Cl. 299-1.000.
Wuchner, Fritz: *See*—
Krevet, Berthold; Schauer, Wolfgang; and Wuchner, Fritz, 4,591,509, Cl. 427-62.000.
Wunning, Joachim. Apparatus for controlling the gas carburization of steel. 4,591,132, Cl. 266-80.000.
Wust, Alfredo, to Bayer Aktiengesellschaft. Process for the production of 2,2'-dibenzothiazolyl disulphide. 4,591,647, Cl. 548-157.000.
Wust, Willi: *See*—
Christophliemk, Peter; and Wust, Willi, 4,591,491, Cl. 423-329.000.
Xerox Corporation: *See*—
Cherian, Abraham, 4,591,145, Cl. 271-258.000.
Day, Gene F.; and Clark, Lloyd D., 4,591,885, Cl. 346-159.000.
Gundlach, Robert W.; and Bergen, Richard F., 4,591,713, Cl. 250-326.000.
Huberman, Bernardo A.; and Hogg, Tad H., 4,591,980, Cl. 364-200.000.
Kuo, Youti; and Young, Dale W., 4,591,259, Cl. 355-3.0SH.
Yip, Kwok-leung, 4,591,260, Cl. 355-3.00R.
Yada, Yoshikuni; and Okazaki, Syunki, to Mazda Motor Corporation. Intake passage for internal combustion engine.. 4,590,895, Cl. 123-52.0MB.
Yagi, Hiroshi; and Harada, Yoshio, to TDK Corporation. Apparatus for inserting square pins into a printed circuit board. 4,590,659, Cl. 29-564.600.
Yagii, Keikichi: *See*—
Kato, Hiroshi; Nakada, Hitoshi; Nishiwaki, Isao; Teramoto, Toshio; Yagii, Keikichi; and Niinomi, Masahiro, 4,591,672, Cl. 179-115.5VC.
Yamada, Kazuhiko: *See*—
Koumura, Ichiro; Kanou, Hideo; Okunishi, Masahiko; and Yamada, Kazuhiko, 4,591,554, Cl. 435-18.000.
Yamada, Kazuji; Kobayashi, Ryoichi; Nagai, Yasuo; Shimizu, Isao; and Kawakami, Kanji, to Hitachi, Ltd. Constant current source device having a ratio metricity between supply voltage and output current. 4,591,780, Cl. 323-313.000.
Yamada, Takaaki, to Sony Corporation. Up/down counter control circuit. 4,592,078, Cl. 377-52.000.
Yamada, Tetsusyo; and Hirate, Shintaro, to NGK Spark Plug Co., Ltd. Air/fuel ratio detector. 4,591,421, Cl. 204-406.000.
Yamagishi, Masaaki, to Olympus Optical Co., Ltd. Microscope objective. 4,591,243, Cl. 350-414.000.
Yamaguchi, Akira; and Masuda, Eiji, to Tokyo Shibaura Denki Kabushiki Kaisha. Differential amplifier circuit. 4,591,801, Cl. 330-261.000.
Yamaguchi, Masafumi; Yamamoto, Akio; and Uemura, Chikao, to Nippon Telegraph and Telephone Public Corporation. Solar cells based on indium phosphide. 4,591,654, Cl. 136-252.000.
Yamaguchi, Yoshinobu: *See*—
Matsuki, Ikuo; Kamiya, Naoyuki; Ikeda, Toshimitsu; Takagi, Yoshiari; Iizuka, Yoshio; Yamaguchi, Yoshinobu; Funai, Hiroshi; Terasawa, Mutsumi; and Tasaka, Susumu, 4,590,905, Cl. 123-321.000.
Yamaguchi, Yukio: *See*—
Uemura, Kichinosuke; and Yamaguchi, Yukio, 4,590,849, Cl. 99-331.000.
Yamaha Hatsudoki Kabushiki Kaisha: *See*—
Marier, Gregory J., 4,591,173, Cl. 280-21.00R.
Yamakido, Kazuo: *See*—
Nishita, Shigeo; Yamakido, Kazuo; and Ohwada, Kenichi, 4,591,827, Cl. 340-347.00C.
Yamamoto, Akio: *See*—
Yamaguchi, Masafumi; Yamamoto, Akio; and Uemura, Chikao, 4,591,654, Cl. 136-252.000.
Yamamoto, Keiichi: *See*—
Sato, Yoji; and Yamamoto, Keiichi, 4,591,699, Cl. 219-497.000.
Yamamoto, Saburo; Hayashi, Hiroshi; and Yano, Seiki, to Sharp Kabushiki Kaisha. (VSIS) semiconductor laser with reduced compressive stress. 4,592,062, Cl. 372-48.000.
Yamamoto, Yoshiko: *See*—
Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi; Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, 4,591,558, Cl. 435-68.000.
Yamashita, Kiyoshi: *See*—
Matsuzaka, Syoji; Kajiwara, Makoto; Miyoshi, Masanobu; and Yamashita, Kiyoshi, 4,591,549, Cl. 430-569.000.
Yamashita, Sadahiko: *See*—
Ohnishi, Hiroshi; and Yamashita, Sadahiko, 4,592,095, Cl. 455-327.000.
Yamat, Miguel B.; and Link, Edwin A., to RTE Corporation. Load-break switch actuator. 4,591,679, Cl. 200-144.00B.
Yamauchi, Teruo; and Oyama, Yoshishige, to Hitachi, Ltd. Multi-cylinder fuel atomizer for automobiles. 4,590,915, Cl. 123-590.000.
Yamaura, Mitsuru, to Tokyo Shibaura Denki Kabushiki Kaisha. Method and system for identifying the direction of a fault in a power -line. 4,591,992, Cl. 364-483.000.
Yamazaki, Shumpei, to Semiconductor Energy Laboratory Co., Ltd. Semiconductor photoelectric conversion device. 4,591,892, Cl. 357-30.000.
Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Photoelectric conversion device utilizing fibrous silicon. 4,591,893, Cl. 357-30.000.
Yanagida, Koji: *See*—
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Yanagida, Koji; Kitagawa, Kazuo; Ochiai, Atsuhiro; Harada, Minoru; and Matsumoto, Hiroshi, 4,591,454, Cl. 252-626.000.
Yanagihashi, Yasuo: *See*—
Honda, Akira; Yanagihashi, Yasuo; and Kumagai, Shinobu, 4,590,985, Cl. 164-440.000.
Yano, Seiki: *See*—
Hayakawa, Toshiro; Miyauchi, Nobuyuki; and Yano, Seiki, 4,592,060, Cl. 372-44.000.
Yamamoto, Saburo; Hayashi, Hiroshi; and Yano, Seiki, 4,592,062, Cl. 372-48.000.
Yano, Toyohiko. Passive implement for converting a television receiver to an optical-art display. 4,591,920, Cl. 358-250.000.
Yasuda, Takashi: *See*—
Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi; Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, 4,591,558, Cl. 435-68.000.
Yasuda, Takatoshi: *See*—
Tanabe, Takeshi; Fujikawa, Kuniyoshi; Yasuda, Takatoshi; and Takeoka, Nobuo, 4,591,684, Cl. 219-10.55B.
Yasuda, Tomio, to Aisin Seiki Kabushiki Kaisha. Electric power steering equipment. 4,591,014, Cl. 180-79.100.
Yasui, Nobuhiko. Polishing apparatus. 4,590,713, Cl. 51-170.00T.
Yazaki, Mitsuhiro, to Kawasaki Jukogyo Kabushiki Kaisha. Apparatus for detecting oil level in oil tank of small-sized marine craft. 4,590,798, Cl. 73-323.000.
Yin, Simon, to Square D Company. High power switching apparatus. 4,591,678, Cl. 200-144.00B.
Yip, Kwok-leung, to Xerox Corporation. Imaging system utilizing an electro-optic device. 4,591,260, Cl. 355-3.00R.
Yokogawa Hokushin Electric Corporation: *See*—
Ohta, Kazufumi, 4,591,871, Cl. 346-49.000.
Yokota, Yuuji; Kajiya, Hiroshi; and Karuishi, Kazuhiro, to Kabushiki Kaisha Sato. Winding mechanism for tape-like web. 4,591,879, Cl. 346-76.0PH.
Yokoyama, Kazumasa; Fukaya, Chikara; Isuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, to Green Cross Corporation, The. Perfluoro compound and emulsion thereof. 4,591,593, Cl. 514-307.000.
Yokoyama, Kazumasa; Fukaya, Chikara; Tsuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, to Green Cross Corporation, The. Perfluoropyrrolizines and emulsions thereof useful as blood substitutes. 4,591,599, Cl. 514-413.000.
Yoshida, Hiroshi; and Ishii, Susumu, to Yoshida Kogyo K. K. Slider for slide fastener. 4,590,648, Cl. 24-415.000.
Yoshida, Kazutoshi: *See*—
Sekiguchi, Yoshihiro; Yoshida, Kazutoshi; Chiba, Shinsaku; Sugie, Mamoru; and Aoki, Hirokazu, 4,592,016, Cl. 365-15.000.
Yoshida Kogyo K. K.: *See*—
Imai, Tetsuji, 4,591,308, Cl. 414-11.000.
Kaminaga, Hiromitsu, 4,590,725, Cl. 52-235.000.
Yoshida, Hiroshi; and Ishii, Susumu, 4,590,648, Cl. 24-415.000.
Yoshida, Takao: *See*—
Mookherjee, Braja D.; Trenkle, Robert W.; Wolff, Robin K.; Boden, Richard M.; and Yoshida, Takao, 4,591,451, Cl. 252-522.00R.
Yoshigi, Naohiro; Chikano, Takahide; and Mori, Yoshitada, to Sapporo Breweries Limited. Process for the preparation of maltopentaose. 4,591,561, Cl. 435-101.000.
Yoshihara, Tetsuya, to Nippon Kokan Kabushiki Kaisha; Nippon Rotary Nozzle Co., Ltd.; Kokan Kikai Kogyo Kabushiki Kaisha; and Tokyo Yogyo Kabushiki Kaisha. Rotary nozzle system for metallurgical vessels. 4,591,080, Cl. 222-598.000.
Yoshinaga, Toru; Sakakibara, Yasuyuki; Abe, Seiko; Watanabe, Kazuhide; and Natsuyama, Yukihiro, to Nippon Soken, Inc. Fuel amount control system in an internal combustion engine. 4,590,908, Cl. 123-357.000.
Yoshino Kogyosho Co., Ltd.: *See*—
Iizuka, Shigeo, 4,591,076, Cl. 222-321.000.
Tsukada, Takami; Ota, Akiho; and Sugiura, Hiroaki, 4,591,060, Cl. 215-1.00C.
Yoshioka, Mamoru: *See*—
Nakamura, Norihiko; Nomura, Kenichi; and Yoshioka, Mamoru, 4,591,170, Cl. 277-235.00B.
Young, Archie R., II: *See*—
Ho, Teh C.; Young, Archie R., II; Chianelli, Russell R.; and Jacobson, Allan J., 4,591,429, Cl. 208-254.00H.

Young, Dale W.: *See*—
Kuo, Youti; and Young, Dale W., 4,591,259, Cl. 355-3.0SH.

Yuasa, Shigeki: *See*—
Okabayashi, Minahiro; Yuasa, Shigeki; and Kusumoto, Koshi, 4,591,575, Cl. 501-154.000.

Yudovich, Amos; and Hays, George E., to Phillips Petroleum Company. Fluid injection method. 4,591,362, Cl. 48-197.00R.

Yumoto, Osamu: *See*—
Hagiwara, Yoshimune; Sugiyama, Shizuo; Maeda, Narimichi; Yumoto, Osamu; Akazawa, Takashi; Kobayashi, Masahito; Kita, Yasuhiro; and Kita, Yuzo, 4,592,006, Cl. 364-748.000.

Zahnradfabrik Friedrichshafen, AG.: *See*—
Lang, Armin; and Knodler, Helmut, 4,590,965, Cl. 137-596.000.

Zajac, Theodore S., to Zaytran Inc. Device for gripping workpieces. 4,591,199, Cl. 794-88.000.

Zaltsman, Vladimir: *See*—
Katsman, Ilya; Ritchie, John A.; Burmenko, Mark; and Zaltsman, Vladimir, 4,590,709, Cl. 49-396.000.

Zaromb, Solomon; Otagawa, Takaaki; and Stetter, Joseph R., to United States of America, Energy. Method of determining methane and electrochemical sensor therefor. 4,591,414, Cl. 204-1.00T.

Zaytran Inc.: *See*—
Zajac, Theodore S., 4,591,199, Cl. 794-88.000.

Zebisch, Manfred W.: *See*—
Rose, Jochen; and Zebisch, Manfred W., 4,591,674, Cl. 200-11.0DA.

Zeller, Reinhard: *See*—
Mamberer, Hans; Zeller, Reinhard; and Spang, Otto, 4,590,856, Cl. 101-350.000.

Zellweger Uster Ltd.: *See*—
Schurch, Robert, 4,591,995, Cl. 364-507.000.

Zenith Electronics Corporation: *See*—
Lai, Stephen H.; and Srivastava, Gopal K., 4,591,910, Cl. 358-148.000.
Palac, Kazimir, 4,591,344, Cl. 445-30.000.

Zerod, Richard D.: *See*—
Charboneau, Ben J.; and Zerod, Richard D., 4,591,839, Cl. 340-620.000.

Zettner, Michael. Rotary combustion chamber reaction engine. 4,590,761, Cl. 60-39.340.

Ziborov, Viktor S.: *See*—
Pryadkin, Pavel P.; Pertsev, Leonid P.; Ziborov, Viktor S.; Pichakhchi, Alexandr F.; Malyshkin, Alexandr A.; and Onufriev, Vladislav N., 4,591,435, Cl. 210-230.000.

Ziegler, Johann, to Telefunken electronic GmbH. Method for the production of monocrystalline $Hg_{1-x}Cd_xTe$. 4,591,410, Cl. 156-616.00R.

Ziem, Eva A.; Larrabee, Graydon B.; and Witter, David E., to Texas Instruments Incorporated. Control of nitrogen and/or oxygen in silicon via nitride oxide pressure during crystal growth. 4,591,409, Cl. 156-605.000.

Zimmermann, Klaus-Dieter; and Hofbauer, Peter, to Robert Bosch GmbH. Internal combustion engine. 4,590,902, Cl. 123-260.000.

Zitz, Alfred: *See*—
Droscher, Bernhard; Schetina, Otto; Wrulich, Herwig; and Zitz, Alfred, 4,591,209, Cl. 299-1.000.

Zoltan, Sandor: *See*—
Tyihak, Erno; Mincsovics, Emil; Knoll, Jozsef; Zoltan, Sandor; Lak, Istvan; Tetenyi, Peter; Kalasz, Huba; and Nagy, Janos, 4,591,524, Cl. 428-167.000.

Zoological Society of San Diego: *See*—
Phillips, John A., 4,591,694, Cl. 219-217.000.

ZVS Adamovske strojirny, koncernovy podnik: *See*—
Sedlak, Vaclav; Jurny, Josef; and Luner, Vaclav, 4,590,858, Cl. 101-352.000.

# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 27TH DAY OF MAY, 1986

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Aida, Yoshiaki: *See—*
Sato, Atsushi; Aida, Yoshiaki; and Shimizu, Isoo, Re. 32,162, Cl. 346-213.000.

Ayres, Peter J.: *See—*
Leigh, Steven; and Ayres, Peter J., Re. 32,161, Cl. 514-588.000.

Davis, William L. Beater. Re. 32,159, Cl. 366-279.000.

Hitachi, Ltd.: *See—*
Tokuda, Hiroastu; Morinaga, Shigeki; and Nakamura, Hideo, Re. 32,163, Cl. 364-431.110.

Kruger, Robert A., to University of Utah, The. Radiographic systems employing multi-linear arrays of electronic radiation detectors. Re. 32,164, Cl. 378-19.000.

Kugler, William E.; and Pacello, James M. Combination roofing material unrolling and heat applying apparatus. Re. 32,160, Cl. 156-497.000.

Leigh, Steven; and Ayres, Peter J., to Phares Pharmecutical Research N.V. Pharmaceutical compositions containing urea. Re. 32,161, Cl. 514-588.000.

Morinaga, Shigeki: *See—*
Tokuda, Hiroastu; Morinaga, Shigeki; and Nakamura, Hideo, Re. 32,163, Cl. 364-431.110.

Nakamura, Hideo: *See—*
Tokuda, Hiroastu; Morinaga, Shigeki; and Nakamura, Hideo, Re. 32,163, Cl. 364-431.110.

Nippon Petrochemicals Co., Ltd.: *See—*
Sato, Atsushi; Aida, Yoshiaki; and Shimizu, Isoo, Re. 32,162, Cl. 346-213.000.

Pacello, James M.: *See—*
Kugler, William E.; and Pacello, James M., Re. 32,160, Cl. 156-497.000.

Phares Pharmecutical Research N.V.: *See—*
Leigh, Steven; and Ayres, Peter J., Re. 32,161, Cl. 514-588.000.

Sato, Atsushi; Aida, Yoshiaki; and Shimizu, Isoo, to Nippon Petrochemicals Co., Ltd. Pressure sensitive record material employing diaryl alkane solvents. Re. 32,162, Cl. 346-213.000.

Shimizu, Isoo: *See—*
Sato, Atsushi; Aida, Yoshiaki; and Shimizu, Isoo, Re. 32,162, Cl. 346-213.000.

Tokuda, Hiroastu; Morinaga, Shigeki; and Nakamura, Hideo, to Hitachi, Ltd. Error preventing device for an electronic engine control apparatus. Re. 32,163, Cl. 364-431.110.

University of Utah, The: *See—*
Kruger, Robert A., Re. 32,164, Cl. 378-19.000.

Vukovic, Marko. Arthroscope. Re. 32,158, Cl. 128-6.000.

Waugh, Charles C.; and Wehrli, Robert L., to Waugh Controls Corporation. Flow meter prover apparatus and method. Re. 32,157, Cl. 73-3.000.

Waugh Controls Corporation: *See—*
Waugh, Charles C.; and Wehrli, Robert L., Re. 32,157, Cl. 73-3.000.

Wehrli, Robert L.: *See—*
Waugh, Charles C.; and Wehrli, Robert L., Re. 32,157, Cl. 73-3.000.

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# LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Axter, Sven E.: *See—*
Quist, William E.; Hyatt, Michael V.; and Axter, Sven E., B1 4,336,075, Cl. 148-2.000.

Boeing Company, The: *See—*
Quist, William E.; Hyatt, Michael V.; and Axter, Sven E., B1 4,336,075, Cl. 148-2.000.

Hyatt, Michael V.: *See—*
Quist, William E.; Hyatt, Michael V.; and Axter, Sven E., B1 4,336,075, Cl. 148-2.000.

Jacoby, Charles E.; and Lindqvist, Per Eric, to SI Handling Systems, Inc. Vehicle and track system. B1 3,818,837, 5-27-86, Cl. 104-166.000.

Lindqvist, Per Eric: *See—*
Jacoby, Charles E.; and Lindqvist, Per Eric, B1 3,818,837, Cl. 104-166.000.

Quist, William E.; Hyatt, Michael V.; and Axter, Sven E., to Boeing Company, The. Aluminum alloy products and method of making same. B1 4,336,075, 5-27-86, Cl. 148-2.000.

SI Handling Systems, Inc.: *See—*
Jacoby, Charles E.; and Lindqvist, Per Eric, B1 3,818,837, Cl. 104-166.000.

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# LIST OF DESIGN PATENTEES

Addleman, Keith A., to Quality Industries, Inc. Silo playground climber and slide. 284,021, 5-27-86, Cl. D21-244.000.

Agari, Atsunori: *See—*
Kuramochi, Izumi; Tokizaki, Hiroshi; Irie, Isamu; Higashide, Daisuke; and Agari, Atsunori, 283,996, Cl. D12-147.000.

Alton, Eric: *See—*
Planten, Staffan; Askeroth, Torbjoern; and Alton, Eric, 283,951, Cl. D4-105.000.

Anderson, James Y. Combined stand and hand grip for flame spraying device. 283,975, 5-27-86, Cl. D8-30.000.

Anzelone, Thomas A., to International Business Machines Corporation. Keyboard panel. 284,009, 5-27-86, Cl. D14-115.000.

Apple Computer, Inc.: *See—*
Esslinger, Hartmut H.; Peart, Stephen; and MacKenzie, William G., 284,008, Cl. D14-113.000.

Arigaya, Fujio, to Takara Co., Ltd. Toy vehicle chassis. 284,019, 5-27-86, Cl. D21-141.000.

Armstrong, William H., to Duo-Therm Corporation, The. Roof-top air conditioner cabinet for a vehicle. 284,025, 5-27-86, Cl. D23-142.000.

Arnett, Jaime R.; Krumreich, Charles L.; and Whetsel, Edgar E., to AT&T Information Systems. Combined power and telephone wall plate. 283,979, 5-27-86, Cl. D8-353.000.

Askeroth, Torbjoern: *See—*
Planten, Staffan; Askeroth, Torbjoern; and Alton, Eric, 283,951, Cl. D4-105.000.

AT&T Information Systems: *See—*
Arnett, Jaime R.; Krumreich, Charles L.; and Whetsel, Edgar E., 283,979, Cl. D8-353.000.

Bally, Alexander, to Mine Safety Appliances Company. Fireman's helmet. 283,940, 5-27-86, Cl. D2-232.000.

Baxa Corporation: *See—*
Fellows, Lindon M.; and Heida, Beverly L., 283,983, Cl. D9-499.000.

BBS Kraftfahrzeugtechnik, GmbH & Co. KG: *See—*
Braungart, Martin, 284,000, Cl. D12-211.000.
Beitel, Jeffrey S.: *See—*
de Leeuwe, Marc; and Beitel, Jeffrey S., 284,035, Cl. D24-58.000.
Berkowitz, Harry D. Combined toothbrush and tongue cleaner. 283,952, 5-27-86, Cl. D4-108.000.
Bosch-Siemens Hausgerate GmbH: *See—*
Friz, Albrecht, 283,971, Cl. D7-383.000.
Braungart, Martin, to BBS Kraftfahrzeugtechnik, GmbH & Co. KG. Vehicle wheel. 284,000, 5-27-86, Cl. D12-211.000.
Brodsky, David L., to Superior Healthcare Group, Inc. Intravenous bottle. 284,033, 5-27-86, Cl. D24-52.000.
Button Fronts, Ltd.: *See—*
Valori, Peter, 283,942, Cl. D2-273.000.
Canron Inc.: *See—*
Milot, Laverne J.; and Werbowy, Kenneth D., 284,022, Cl. D23-43.000.
Cappadona, Richard; and Iwatsuki, Kohei, to Carico Distributors Inc. Handle for a knife. 283,967, 5-27-86, Cl. D7-152.000.
Carico Distributors Inc.: *See—*
Cappadona, Richard; and Iwatsuki, Kohei, 283,967, Cl. D7-152.000.
Carlson, Arthur R., to Decor Corporation Proprietary Limited, The. Container. 283,966, 5-27-86, Cl. D7-76.000.
Chase, Nelson L. Carrying case for toy. 283,946, 5-27-86, Cl. D3-30.100.
Chen, Laurence. Heat collector for smoke alarm. 283,989, 5-27-86, Cl. D10-106.000.
Citizen Tokei Kabushiki Kaisha: *See—*
Mitsuhashi, Toshio, 284,012, Cl. D18-13.000.
Citizen Watch Co., Ltd.: *See—*
Kano, Hayao, 283,984, Cl. D10-39.000.
Sakamaki, Yasuyuki, 283,985, Cl. D10-39.000.
Clouser, Leon C.; Klaus, Gerald R.; Nizzere, Paul D.; O'Neil, Robert A.; Ramsdale, Douglas S.; and Williams, Thomas E., to Fellowes Manufacturing Company. Storage and filing container for magnetic disks. 283,948, 5-27-86, Cl. D3-35.000.
Cooper Thermometer Company, The: *See—*
Kaniwec, George N., 283,988, Cl. D10-101.000.
Culbreath, Johnny H. Perfume bottle. 283,981, 5-27-86, Cl. D9-389.000.
Davidson, Bruce B. G. Combined support, medallion and tassel pendant. 283,990, 5-27-86, Cl. D11-97.000.
Davis, Margaret D. Simulative balloon. 284,016, 5-27-86, Cl. D21-84.000.
Daws, Bryan E., to Phoenix Newspapers, Inc. Display stand. 283,954, 5-27-86, Cl. D6-310.000.
Decor Corporation Proprietary Limited, The: *See—*
Carlson, Arthur R., 283,966, Cl. D7-76.000.
de Leeuwe, Marc; and Beitel, Jeffrey S., to Union Carbide Corporation. Chemical container. 284,035, 5-27-86, Cl. D24-58.000.
Devito, Joseph P.: *See—*
Tendrup, Donald L.; and Devito, Joseph P., 283,992, Cl. D11-148.000.
Dito-Sama: *See—*
Prevot, Olivier H. C., 283,972, Cl. D7-384.000.
Doyle, James P., to Johnson & Johnson Products, Inc. Toothbrush holder. 283,961, 5-27-86, Cl. D6-534.000.
Duo-Therm Corporation, The: *See—*
Armstrong, William H., 284,025, Cl. D23-142.000.
E.T.M. Corporation: *See—*
Johnson, Gary L., 284,027, Cl. D24-16.000.
Esslinger, Hartmut H.; Peart, Stephen; and MacKenzie, William G., to Apple Computer, Inc. Video display for use with a computer. 284,008, 5-27-86, Cl. D14-113.000.
Fellowes Manufacturing Company: *See—*
Clouser, Leon C.; Klaus, Gerald R.; Nizzere, Paul D.; O'Neil, Robert A.; Ramsdale, Douglas S.; and Williams, Thomas E., 283,948, Cl. D3-35.000.
Fellows, Lindon M.; and Heida, Beverly L., to Baxa Corporation. Seal for a container cap or outlet part. 283,983, 5-27-86, Cl. D9-499.000.
Fitou, Jean, to Societe des Proprietaires Vinicoles de Cognac J. G. Minnot & Co. Portable bar. 283,965, 5-27-86, Cl. D7-70.000.
Flandin, Gerard: *See—*
Ludvig, Pierre; and Flandin, Gerard, 284,031, Cl. D27-36.000.
Ford Motor Company: *See—*
Telnack, John J., 283,999, Cl. D12-196.000.
Freijd, Ingvar, to Telefonaktiebolaget LM Ericsson. Printer for data terminals with receipt/journal unit. 284,006, 5-27-86, Cl. D14-111.000.
Freijd, Ingvar, to Telefonaktiebolaget LM Ericsson. Printer for data terminals with receipt/journal unit. 284,007, 5-27-86, Cl. D14-111.000.
Friz, Albrecht, to Bosch-Siemens Hausgerate GmbH. Slicing machine. 283,971, 5-27-86, Cl. D7-383.000.
Fukuda, Harumi: *See—*
Nishibori, Hiroshi; and Fukuda, Harumi, 284,029, Cl. D24-21.000.
G.B.P., Inc.: *See—*
Perry, George, 283,994, Cl. D12-83.000.
Giannotti, Vincent, Jr.; and Smith, James B., to International Business Machines Corporation. Display platform with folding keyboard storage shelf. 283,960, 5-27-86, Cl. D6-511.000.
Graves, Harold C. Truck driver's hammer. 283,976, 5-27-86, Cl. D8-75.000.
Greene & Kellogg, Inc.: *See—*
McCombs, Norman R., 284,026, Cl. D24-1.100.
Grime, David L., to Kendall McGaw Laboratories, Inc. Intravenous line filter. 284,034, 5-27-86, Cl. D24-52.000.
Hagedorn, Leonhard; and Schulein, Rolf-Gunter, to Leifheit AG. Rack for can opener. 283,962, 5-27-86, Cl. D6-553.000.
Harris, Floyd D. Twist-lock spark plug. 284,001, 5-27-86, Cl. D13-16.000.
Harwood Manufacturing Company: *See—*
Markowitz, Aaron, 283,950, Cl. D3-58.000.
Haswell, Robert F. Bottle. 283,980, 5-27-86, Cl. D9-307.000.
Heida, Beverly L.: *See—*
Fellows, Lindon M.; and Heida, Beverly L., 283,983, Cl. D9-499.000.
Henson, LaDonna S. Novelty toy figure. 284,020, 5-27-86, Cl. D21-148.000.
Higashide, Daisuke: *See—*
Kuramochi, Izumi; Tokizaki, Hiroshi; Irie, Isamu; Higashide, Daisuke; and Agari, Atsunori, 283,996, Cl. D12-147.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Kohama, Mitsuyoshi; and Oba, Takeshi, 283,995, Cl. D12-110.000.
Hougaard, Erling, to Os Plastic A/S. Modular template horticultural film for collocation of potted plants. 283,973, 5-27-86, Cl. D8-1.000.
Ichikawa, Takashi: *See—*
Iwasaki, Mitsuhiro; and Ichikawa, Takashi, 284,014, Cl. D18-15.000.
International Business Machines Corporation: *See—*
Anzelone, Thomas A., 284,009, Cl. D14-115.000.
Giannotti, Vincent, Jr.; and Smith, James B., 283,960, Cl. D6-511.000.
Irie, Isamu: *See—*
Kuramochi, Izumi; Tokizaki, Hiroshi; Irie, Isamu; Higashide, Daisuke; and Agari, Atsunori, 283,996, Cl. D12-147.000.
Isaacs, Robert B., to Northern Telecom Limited. Telephone set add-on accessory stand. 284,005, 5-27-86, Cl. D14-59.000.
Iscar Ltd.: *See—*
Pano, Joseph, 284,011, Cl. D15-139.000.
Iwasaki, Mitsuhiro; and Ichikawa, Takashi, to Shachihata Industrial Co., Ltd. Stamp. 284,014, 5-27-86, Cl. D18-15.000.
Iwatsuki, Kohei: *See—*
Cappadona, Richard; and Iwatsuki, Kohei, 283,967, Cl. D7-152.000.
Jacobson, Jeff A. Roller for a blind cleaner. 283,953, 5-27-86, Cl. D4-122.000.
Jam Sun Office Products, Inc.: *See—*
Sun, Jam, 283,959, Cl. D6-492.000.
Janome Sewing Machine Co. Ltd.: *See—*
Kuroki, Nobufusa, 284,013, Cl. D18-13.000.
Johnny Olson and Company, Inc.: *See—*
Olson, John C., 284,024, Cl. D23-69.000.
Johnson, Gary L., to E.T.M. Corporation. Tips for orthodontic band-seating plier. 284,027, 5-27-86, Cl. D24-16.000.
Johnson & Johnson Products, Inc.: *See—*
Doyle, James P., 283,961, Cl. D6-534.000.
Kamentsky, Howard S., to Quaker Oats Company, The. Shape toy. 284,015, 5-27-86, Cl. D21-59.000.
Kaneko, Toshiro. Box for cultivating vegetables or the like. 283,993, 5-27-86, Cl. D11-155.000.
Kaniwec, George N., to Cooper Thermometer Company, The. Fuel gauge for propane tank. 283,988, 5-27-86, Cl. D10-101.000.
Kano, Hayao, to Citizen Watch Co., Ltd. Wrist watch. 283,984, 5-27-86, Cl. D10-39.000.
Kendall McGaw Laboratories, Inc.: *See—*
Grime, David L., 284,034, Cl. D24-52.000.
Kirk, Alexis V., to Somersett Moon. Belt buckle. 283,944, 5-27-86, Cl. D2-420.000.
Kirk, Alexis V., to Somersett Moon. Belt buckle. 283,945, 5-27-86, Cl. D2-431.000.
Kitada, Katsuichi. Floppy disk storage box. 283,949, 5-27-86, Cl. D3-35.000.
Klaus, Gerald R.: *See—*
Clouser, Leon C.; Klaus, Gerald R.; Nizzere, Paul D.; O'Neil, Robert A.; Ramsdale, Douglas S.; and Williams, Thomas E., 283,948, Cl. D3-35.000.
Kohama, Mitsuyoshi; and Oba, Takeshi, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle. 283,995, 5-27-86, Cl. D12-110.000.
Krumreich, Charles L.: *See—*
Arnett, Jaime R.; Krumreich, Charles L.; and Whetsel, Edgar E., 283,979, Cl. D8-353.000.
Kunzler, Herold. Handle for an attache case and posts therefor. 283,977, 5-27-86, Cl. D8-301.000.
Kuramochi, Izumi; Tokizaki, Hiroshi; Irie, Isamu; Higashide, Daisuke; and Agari, Atsunori, to Yokohama Rubber Co., Ltd., The. Automobile tire. 283,996, 5-27-86, Cl. D12-147.000.
Kuroki, Nobufusa, to Janome Sewing Machine Co. Ltd. Printer. 284,013, 5-27-86, Cl. D18-13.000.
Leifheit AG: *See—*
Hagedorn, Leonhard; and Schulein, Rolf-Gunter, 283,962, Cl. D6-553.000.
Lemmeyer, Gary R., to Quaker Oats Company, The. High chair. 283,956, 5-27-86, Cl. D6-339.000.
Lin, Johnny K., to 3L Plastics USA, Inc. Toy motorcycle. 284,018, 5-27-86, Cl. D21-134.000.
Lipski, Mordecai. Toilet seat for infants. 284,023, 5-27-86, Cl. D23-53.000.
Ludvig, Pierre; and Flandin, Gerard, to Flandin, Gerard. Lighter. 284,031, 5-27-86, Cl. D27-36.000.
MacKenzie, William G.: *See—*
Esslinger, Hartmut H.; Peart, Stephen; and MacKenzie, William G., 284,008, Cl. D14-113.000.

Markowitz, Aaron, to Harwood Manufacturing Company. Combined card and calculator case. 283,950, 5-27-86, Cl. D3-58.000.
Marquis, Carl D., to Vernon Company, The. Knife handle. 283,968, 5-27-86, Cl. D7-152.000.
McCombs, Norman R., to Greene & Kellogg, Inc. Oxygen concentrator. 284,026, 5-27-86, Cl. D24-1.100.
McFarlane, Richard H. Shield for hypodermic needle. 284,030, 5-27-86, Cl. D24-25.000.
McGrew, James D. Combined fid and stitcher for splicing braided line. 283,974, 5-27-86, Cl. D8-14.000.
Mengshoel, Hans C.; and Opsvik, Peter. Combined leg and knee rest or similar article. 283,955, 5-27-86, Cl. D6-330.000.
Miller, Randy L.: *See—*
Wahl, Gregory S.; and Miller, Randy L., 284,032, Cl. D24-36.000.
Mills, Laurence P., to Taboola Pty. Limited. Key blank. 283,978, 5-27-86, Cl. D8-347.000.
Milot, Laverne J.; and Werbowy, Kenneth D., to Canron Inc. Backing ring for a pipe coupling. 284,022, 5-27-86, Cl. D23-43.000.
Mine Safety Appliances Company: *See—*
Bally, Alexander, 283,940, Cl. D2-232.000.
Mitsuhashi, Toshio, to Citizen Tokei Kabushiki Kaisha. Printer. 284,012, 5-27-86, Cl. D18-13.000.
Nishibori, Hiroshi; and Fukuda, Harumi, to Sharp Corporation. Digital sphygmomanometer. 284,029, 5-27-86, Cl. D24-21.000.
Nizzere, Paul D.: *See—*
Clouser, Leon C.; Klaus, Gerald R.; Nizzere, Paul D.; O'Neil, Robert A.; Ramsdale, Douglas S.; and Williams, Thomas E., 283,948, Cl. D3-35.000.
Northern Telecom Limited: *See—*
Isaacs, Robert B., 284,005, Cl. D14-59.000.
Oba, Takeshi: *See—*
Kohama, Mitsuyoshi; and Oba, Takeshi, 283,995, Cl. D12-110.000.
Olson, John C., to Johnny Olson and Company, Inc. Clamping strip for shower curtain. 284,024, 5-27-86, Cl. D23-69.000.
Olson, Kenneth A. Cap for tube type dispensers. 283,982, 5-27-86, Cl. D9-442.000.
O'Neil, Robert A.: *See—*
Clouser, Leon C.; Klaus, Gerald R.; Nizzere, Paul D.; O'Neil, Robert A.; Ramsdale, Douglas S.; and Williams, Thomas E., 283,948, Cl. D3-35.000.
Opsvik, Peter: *See—*
Mengshoel, Hans C.; and Opsvik, Peter, 283,955, Cl. D6-330.000.
Os Plastic A/S: *See—*
Hougaard, Erling, 283,973, Cl. D8-1.000.
Pano, Joseph, to Iscar Ltd. Cutting insert. 284,011, 5-27-86, Cl. D15-139.000.
Payne, J. B., Jr. Computer desk. 283,958, 5-27-86, Cl. D6-426.000.
Peart, Stephen: *See—*
Esslinger, Hartmut H.; Peart, Stephen; and MacKenzie, William G., 284,008, Cl. D14-113.000.
Perry, George, to G.B.P., Inc. Transportable refreshment stand. 283,994, 5-27-86, Cl. D12-83.000.
Phoenix Newspapers, Inc.: *See—*
Daws, Bryan E., 283,954, Cl. D6-310.000.
Picotronics Industries Limited: *See—*
Yu, Him-Chi, 284,004, Cl. D14-58.000.
Pioneer Electronic Corporation: *See—*
Takagi, You, 284,002, Cl. D14-30.000.
Planten, Staffan; Askeroth, Torbjoern; and Alton, Eric. Toothbrush. 283,951, 5-27-86, Cl. D4-105.000.
Prevot, Olivier H. C., to Dito-Sama. Food processor. 283,972, 5-27-86, Cl. D7-384.000.
Quaker Oats Company, The: *See—*
Kamentsky, Howard S., 284,015, Cl. D21-59.000.
Lemmeyer, Gary R., 283,956, Cl. D6-339.000.
Smith, M. Allyson, 284,017, Cl. D21-109.000.
Quality Industries, Inc.: *See—*
Addleman, Keith A., 284,021, Cl. D21-244.000.
Rainey, Peggy L. Sweatband with storage compartment. 283,943, 5-27-86, Cl. D2-400.000.
Ramsdale, Douglas S.: *See—*
Clouser, Leon C.; Klaus, Gerald R.; Nizzere, Paul D.; O'Neil, Robert A.; Ramsdale, Douglas S.; and Williams, Thomas E., 283,948, Cl. D3-35.000.
Rosenthal Aktiengesellschaft Rechtsabteilung: *See—*
van Loon, Johan, 283,991, Cl. D11-143.000.
Rowland, Frieda H. Pillow. 283,963, 5-27-86, Cl. D6-599.000.
Sakamaki, Yasuyuki, to Citizen Watch Co., Ltd. Wrist watch. 283,985, 5-27-86, Cl. D10-39.000.
Sastre, Roger, to SEB. Electric coffeemaker. 283,969, 5-27-86, Cl. D7-309.000.
Schulein, Rolf-Gunter: *See—*
Hagedorn, Leonhard; and Schulein, Rolf-Gunter, 283,962, Cl. D6-553.000.
Scoppettone, Ronald. Insert for an eyeglass case. 283,947, 5-27-86, Cl. D3-34.000.
Seager, Richard H., to Warner-Lambert Company. Sigmoidoscope. 284,028, 5-27-86, Cl. D24-18.000.
SEB: *See—*
Sastre, Roger, 283,969, Cl. D7-309.000.
Thevenin, Jean M., 283,970, Cl. D7-360.000.
Shachihata Industrial Co., Ltd.: *See—*
Iwasaki, Mitsuhiro; and Ichikawa, Takashi, 284,014, Cl. D18-15.000.
Sharp Corporation: *See—*
Nishibori, Hiroshi; and Fukuda, Harumi, 284,029, Cl. D24-21.000.
Shun, So. Pastry cutter with removable cutting molds. 283,964, 5-27-86, Cl. D7-43.000.
Smidt, Gary L. Hand held dynamometer. 283,987, 5-27-86, Cl. D10-83.000.
Smith, James B.: *See—*
Giannotti, Vincent, Jr.; and Smith, James B., 283,960, Cl. D6-511.000.
Smith, M. Allyson, to Quaker Oats Company, The. Toy calculator. 284,017, 5-27-86, Cl. D21-109.000.
Smith, Martha N. Crocheted hat. 283,941, 5-27-86, Cl. D2-257.000.
Societe des Proprietaires Vinicoles de Cognac J. G. Minnot & Co.: *See—*
Fitou, Jean, 283,965, Cl. D7-70.000.
Sogorka, Gary M. Expansible proportional rule. 283,986, 5-27-86, Cl. D10-71.000.
Somersett Moon: *See—*
Kirk, Alexis V., 283,944, Cl. D2-420.000.
Kirk, Alexis V., 283,945, Cl. D2-431.000.
Stravitz, David M. Cassette storage rack. 283,957, 5-27-86, Cl. D6-407.000.
Sun, Jam, to Jam Sun Office Products, Inc. Face panel for a tape storage drawer. 283,959, 5-27-86, Cl. D6-492.000.
Superior Healthcare Group, Inc.: *See—*
Brodsky, David L., 284,033, Cl. D24-52.000.
Taboola Pty. Limited: *See—*
Mills, Laurence P., 283,978, Cl. D8-347.000.
Takagi, You, to Pioneer Electronic Corporation. Loudspeaker. 284,002, 5-27-86, Cl. D14-30.000.
Takara Co., Ltd.: *See—*
Arigaya, Fujio, 284,019, Cl. D21-141.000.
Tamura, Shuichi, to Yamatake - Honeywell Co., Ltd. Telephone set. 284,003, 5-27-86, Cl. D14-56.000.
Tanaka Mfg. Co. Ltd.: *See—*
Tanaka, Yoshihisa, 283,998, Cl. D12-187.000.
Tanaka, Yoshihisa, to Tanaka Mfg. Co. Ltd. Portable mirror for vehicles. 283,998, 5-27-86, Cl. D12-187.000.
Telefonaktiebolaget LM Ericsson: *See—*
Freijd, Ingvar, 284,006, Cl. D14-111.000.
Freijd, Ingvar, 284,007, Cl. D14-111.000.
Telnack, John J., to Ford Motor Company. Automobile quarter panel. 283,999, 5-27-86, Cl. D12-196.000.
Tendrup, Donald L.; and Devito, Joseph P. Hanging planter. 283,992, 5-27-86, Cl. D11-148.000.
Thevenin, Jean M., to SEB. Deep fryer. 283,970, 5-27-86, Cl. D7-360.000.
Thomas, Paul E. Replacement van top. 283,997, 5-27-86, Cl. D12-156.000.
Tokizaki, Hiroshi: *See—*
Kuramochi, Izumi; Tokizaki, Hiroshi; Irie, Isamu; Higashide, Daisuke; and Agari, Atsunori, 283,996, Cl. D12-147.000.
Union Carbide Corporation: *See—*
de Leeuwe, Marc; and Beitel, Jeffrey S., 284,035, Cl. D24-58.000.
Valori, Peter, to Button Fronts, Ltd. Boot. 283,942, 5-27-86, Cl. D2-273.000.
van Loon, Johan, to Rosenthal Aktiengesellschaft Rechtsabteilung. Vase. 283,991, 5-27-86, Cl. D11-143.000.
Vernon Company, The: *See—*
Marquis, Carl D., 283,968, Cl. D7-152.000.
Voyce, Terry. Loader tooth for a front end loader. 284,010, 5-27-86, Cl. D15-29.000.
Wahl Clipper Corporation: *See—*
Wahl, Gregory S.; and Miller, Randy L., 284,032, Cl. D24-36.000.
Wahl, Gregory S.; and Miller, Randy L., to Wahl Clipper Corporation. Back massager. 284,032, 5-27-86, Cl. D24-36.000.
Warner-Lambert Company: *See—*
Seager, Richard H., 284,028, Cl. D24-18.000.
Werbowy, Kenneth D.: *See—*
Milot, Laverne J.; and Werbowy, Kenneth D., 284,022, Cl. D23-43.000.
Whetsel, Edgar E.: *See—*
Arnett, Jaime R.; Krumreich, Charles L.; and Whetsel, Edgar E., 283,979, Cl. D8-353.000.
Williams, Thomas E.: *See—*
Clouser, Leon C.; Klaus, Gerald R.; Nizzere, Paul D.; O'Neil, Robert A.; Ramsdale, Douglas S.; and Williams, Thomas E., 283,948, Cl. D3-35.000.
Yamatake - Honeywell Co., Ltd.: *See—*
Tamura, Shuichi, 284,003, Cl. D14-56.000.
Yokohama Rubber Co., Ltd., The: *See—*
Kuramochi, Izumi; Tokizaki, Hiroshi; Irie, Isamu; Higashide, Daisuke; and Agari, Atsunori, 283,996, Cl. D12-147.000.
Yu, Him-Chi, to Picotronics Industries Limited. Telephone. 284,004, 5-27-86, Cl. D14-58.000.
3L Plastics USA, Inc.: *See—*
Lin, Johnny K., 284,018, Cl. D21-134.000.

# CLASSIFICATION OF PATENTS

## ISSUED MAY 27, 1986

NOTE.—First number, class; second number, subclass; third number, patent number

**CLASS 2**

2 4,590,621
4,590,622
85 4,590,623
114 4,590,624
161 A 4,590,625
163 4,590,626
4,590,627

**CLASS 4**

191 4,590,628
213 4,590,629

**CLASS 5**

13 4,590,630
101 4,590,631
462 4,590,632
482 4,590,633

**CLASS 8**

436 4,591,359
471 4,591,360
538 4,591,361

**CLASS 14**

71.1 4,590,634

**CLASS 15**

50 R 4,590,635
94 4,590,636
160 4,590,637
250.42 4,590,638

**CLASS 16**

79 4,590,639
114 B 4,590,640
238 4,590,641
241 4,590,642

**CLASS 17**

11 4,590,643
49 4,590,830
76 4,590,644

**CLASS 19**

114 4,590,645
262 4,590,646
4,590,647

**CLASS 24**

415 4,590,648
616 4,590,649

**CLASS 29**

33 M 4,590,650
80 4,590,651
156.8 R 4,590,653
157 R 4,590,652
407 4,590,654
421 R 4,590,655
450 4,590,656
458 4,590,657
464 4,590,658
564.6 4,590,659
566.3 4,590,660
568 4,590,661
4,590,662
571 4,590,663
4,590,664
4,590,665
578 4,590,666
589 4,590,667
596 4,590,668
612 4,590,669
622 4,590,670
723 4,590,671
827 4,590,672
845 4,590,673

**CLASS 30**

49 4,590,674
133 4,590,675
276 4,590,676

**CLASS 33**

42 4,590,677
199 R 4,590,678
361 4,590,679
366 4,590,680
378 4,590,681
383 4,590,682

**CLASS 34**

1 4,590,683
5 4,590,684
31 4,590,685
86 4,590,686
97 4,590,687
124 4,590,688

**CLASS 36**

3 B 4,590,689
18 4,590,690
119 4,590,691
120 4,590,692
126 4,590,693

**CLASS 37**

233 4,590,694

**CLASS 38**

102.2 4,590,695

**CLASS 40**

156 4,590,696

**CLASS 42**

70 F 4,590,697
78 4,590,698

**CLASS 43**

2 4,590,699
5 4,590,700
17 4,590,701
53.5 4,590,702
61 4,590,703
4,590,704

**CLASS 47**

25 4,590,705

**CLASS 48**

197 R 4,591,362

**CLASS 49**

57 4,590,706
130 4,590,707
181 4,590,708
396 4,590,709
478 4,590,710

**CLASS 51**

3 4,590,711
161 4,590,712
170 T 4,590,713
293 4,591,363
309 4,591,364

**CLASS 52**

3 4,590,714
4,590,715
12 4,590,716
64 4,590,717
116 4,590,718
4,590,719
121 4,590,720
169.1 4,590,721
169.5 4,590,722
211 4,590,723
223 L 4,590,724
235 4,590,725
314 4,590,726
406 4,590,727
410 4,590,728
437 4,590,729
461 4,590,730
581 4,590,731
704 4,590,732
741 4,590,733

**CLASS 53**

52 4,590,734
77 4,590,735
137 4,590,736
211 4,590,737
266 R 4,590,738
391 4,590,739
426 4,590,740
427 4,590,741
430 4,590,742
446 4,590,743
497 4,590,744
541 4,590,745
556 4,590,746
562 4,590,747
576 4,590,748
4,590,749

**CLASS 54**

46 4,590,750

**CLASS 55**

16 4,591,365
20 4,591,366
344 4,591,367
372 4,591,368
374 4,591,369

**CLASS 56**

192 4,590,751

**CLASS 57**

9 4,590,752
22 4,590,753
58.55 4,590,754
293 4,590,755
401 4,590,756
412 4,590,757

**CLASS 59**

85 4,590,758

**CLASS 60**

39.03 4,590,759
39.12 4,590,760
39.34 4,590,761
293 4,590,762
327 4,590,763
390 4,590,764
585 4,590,765
618 4,590,766
668 4,590,767
741 4,590,768
752 4,590,769

**CLASS 62**

17 4,591,370
52 4,590,770
156 4,590,771
184 4,590,772
333 4,590,773
347 4,590,774

**CLASS 63**

14 G 4,590,775

**CLASS 65**

1 4,591,371
4.2 4,591,372
29 4,591,373
350 4,591,374

**CLASS 66**

205 4,590,776

**CLASS 70**

104 4,590,777

**CLASS 71**

28 4,591,375
90 4,591,376
92 4,591,377
93 4,591,378
94 4,591,379

**CLASS 72**

19 4,590,778
181 4,590,781
294 4,590,779
328 4,590,780
354 4,590,782
384 4,590,783
389 4,590,784
392 4,590,785
410 4,590,786
454 4,590,787
481 4,590,788

**CLASS 73**

1 G 4,590,789
3 Re.32,157
4,590,790
4 R 4,590,791
28 4,590,792
40 4,590,793
48 4,590,794
73 4,590,795
113 4,590,796
295 4,590,797
323 4,590,798
432 R 4,590,799
449 4,590,800
510 4,590,801
573 4,590,802
590 4,590,803
762 4,590,804
861.87 4,590,805
862.34 4,590,806
862.36 4,590,807
862.48 4,590,808
863.53 4,590,809
864.63 4,590,810

**CLASS 74**

7 E 4,590,811
55 4,590,812
64 4,590,813
87 4,590,814
191 4,590,815
424.8 NA 4,590,816
473 R 4,590,817
4,590,818
501 R 4,590,819
640 4,590,820

**CLASS 75**

35 4,591,380
40 4,591,381
84.1 R 4,591,382
93 R 4,591,383

**CLASS 81**

3.37 4,590,821
3.55 4,590,822
53.2 4,590,826
57.14 4,590,823
440 4,590,824
451 4,590,825

**CLASS 82**

11 4,590,827
24 R 4,590,828

**CLASS 83**

22 4,590,829
56 4,590,831
100 4,590,832
367 4,590,833
455 4,590,834
698 4,590,835
834 4,590,836
846 4,590,837

**CLASS 84**

1.01 4,590,838
422 S 4,590,839

**CLASS 86**

10 4,590,840
36 4,590,841

**CLASS 89**

1.13 4,590,844
8 4,590,842
45 4,590,843

**CLASS 91**

369 A 4,590,845

**CLASS 92**

151 4,590,846

**CLASS 98**

115.3 4,590,847

**CLASS 99**

331 4,590,849
339 4,590,848
348 4,590,850
455 4,590,851
4,590,852

**CLASS 101**

35 4,590,854
93.48 4,590,853
157 4,590,855
350 4,590,856
4,590,857
352 4,590,858
426 4,590,859

**CLASS 102**

289 4,590,860
501 4,590,861
522 4,590,862

**CLASS 104**

133 4,590,863
166 B1 3,818,837

**CLASS 105**

199 S 4,590,864

**CLASS 106**

35 4,591,384
38.3 4,591,385

**CLASS 108**

1 4,590,865
23 4,590,866

**CLASS 110**

336 4,590,867
347 4,590,868

**CLASS 111**

88 4,590,869

**CLASS 112**

70 4,590,870
121.12 4,590,872
121.14 4,590,873
121.26 4,590,874
142 4,590,871
168 4,590,875
262.3 4,590,876
4,590,877
266.1 4,590,878
278 4,590,879
445 4,590,880
456 4,590,881

**CLASS 114**

108 4,590,882

**CLASS 116**

173 4,590,883

**CLASS 118**

308 4,590,884

**CLASS 119**

19 4,590,885
27 4,590,886
103 4,590,887

**CLASS 122**

149 4,590,888

**CLASS 123**

41.05 4,590,889
41.11 4,590,891
41.12 4,590,892
41.21 4,590,893
41.7 4,590,890
41.74 4,590,894
52 MB 4,590,895
73 A 4,590,897
73 R 4,590,896
90.55 4,590,898
90.58 4,590,899
90.67 4,590,900
193 P 4,590,901
260 4,590,902
300 4,590,903
4,590,904
321 4,590,905
339 4,590,906
357 4,590,907
4,590,908
360 4,590,909
458 4,590,910
468 4,590,911
478 4,590,912
502 4,590,913
557 4,590,914
590 4,590,915

**CLASS 126**

21 A 4,590,916
90 R 4,590,917
247 4,590,918
382 4,590,919
425 4,590,920
438 4,590,921

**CLASS 127**

1 4,591,386
24 4,591,387
46.3 4,591,388

**CLASS 128**

1.3 4,590,922
6 Re.32,158
4,590,923
4,590,924
24 R 4,590,925
67 4,590,926
79 4,590,927
92 BC 4,590,930
92 D 4,590,928
92 E 4,590,929
162 4,590,931
166 4,590,932
204.23 4,590,951
205.24 4,590,933
303.14 4,590,934
305 4,590,935
4,590,936
325 4,590,937
328 4,590,938
329 A 4,590,939
376 4,590,940
419 D 4,590,943
419 PG 4,590,941
4,590,944
419 R 4,590,942
455 4,590,945
642 4,590,946
653 4,590,947
666 4,590,948
785 4,590,949
786 4,590,950

**CLASS 131**

94 4,590,952
276 4,590,953
299 4,590,954
365 4,590,955

**CLASS 134**

8 4,591,389
15 4,591,390
22.17 4,591,391
25.4 4,591,392

**CLASS 135**

116 4,590,956

**CLASS 136**

252 4,591,654

**CLASS 137**

68.1 4,590,957
115 4,590,958
315 4,590,959
4,590,960
355.16 4,590,961
498 4,590,962
554 4,590,963
565 4,590,964
596 4,590,965
596.17 4,590,966
613 4,590,967
625.64 4,590,968
637.2 4,590,969
828 4,590,970

**CLASS 138**

149 4,590,971

**CLASS 139**

435 4,590,972
443 4,590,973

**CLASS 141**

1 4,590,974
4,590,975
66 4,590,976
129 4,590,977

**CLASS 144**

174 4,590,978
208 F 4,590,979

**CLASS 148**

2 B1 4,336,075
11.5 N 4,591,393
11.5 Q 4,591,394
12 D 4,591,395
12 F 4,591,396
15.5 4,591,397
187 4,591,398

**CLASS 149**

2 4,591,399

**CLASS 152**

323 4,590,980

**CLASS 156**

80 4,591,400
89 4,591,401
350 4,591,402
364 4,591,403
384 4,591,404
446 4,591,405
484 4,591,406
497 Re.32,160
527 4,591,407
605 4,591,408
4,591,409
616 R 4,591,410
634 4,591,411

**CLASS 162**

158 4,591,412

**CLASS 164**

112 4,590,981
253 4,590,982
258 4,590,983
426 4,590,984
440 4,590,985
448 4,590,986
457 4,590,987
463 4,590,988
504 4,590,989

**CLASS 165**

54 4,590,990
69 4,590,991
104.19 4,590,992
104.31 4,590,993
119 4,590,994

**CLASS 166**

127 4,590,995
244.1 4,590,996
250 4,590,997
331 4,590,998

**CLASS 169**

37 4,590,999
54 4,591,000

**CLASS 172**

43 4,591,001
510 4,591,002
597 4,591,003

**CLASS 173**

17 4,591,004
164 4,591,005

**CLASS 174**

22 C 4,591,655
48 4,591,656
50 4,591,657
65 R 4,591,658
68.5 4,591,659

**CLASS 175**

52 4,591,006
85 4,591,007
227 4,591,008
320 4,591,009
4,591,010

**CLASS 177**

122 4,591,011
145 4,591,012
230 4,591,013

**CLASS 178**

22.05 4,591,660

**CLASS 179**

1.5 R 4,591,673
2 C 4,591,663
2 DP 4,591,662
2 EA 4,591,661
6.06 4,591,664
18 FH 4,591,665
90 B 4,591,666
115.5 ES 4,591,667
115.5 VC 4,591,672
121 C 4,591,668
170.2 4,591,669
4,591,670
175.2 R 4,591,671

**CLASS 180**

79.1 4,591,014
119 4,591,015
165 4,591,016
205 4,591,017
260 4,591,018
275 4,591,019

**CLASS 181**

145 4,591,020

**CLASS 182**

10 4,591,021
47 4,591,022
200 4,591,023

**CLASS 184**

11.2 4,591,024

**CLASS 187**

20 4,591,025

**CLASS 188**

2 D 4,591,026
24.11 4,591,027
72.2 4,591,028
134 4,591,029
268 4,591,030
287 4,591,031
313 4,591,032
317 4,591,033

**CLASS 192**

0.073 4,591,038
3.58 4,591,034
3.59 4,591,035
27 4,591,036
58 B 4,591,037
91 A 4,591,039
106.2 4,591,040
107 R 4,591,041

**CLASS 194**

225 4,591,042

**CLASS 198**

346.3 4,591,044
425 4,591,043
456 4,591,045
457 4,591,046

**CLASS 200**

11 DA 4,591,674
52 R 4,591,675
61.45 M 4,591,676
83 J 4,591,677
144 B 4,591,678
4,591,679
146 R 4,591,680

**CLASS 202**

173 4,591,413

**CLASS 204**

1 T 4,591,414
15 4,591,415
35.1 4,591,416
192 P 4,591,418
192 R 4,591,417
243 R 4,591,419
297 W 4,591,420
406 4,591,421
426 4,591,422
428 4,591,423

**CLASS 206**

45.18 4,591,047
63.3 4,591,048
222 4,591,049
4,591,050
315.9 4,591,051
328 4,591,052
331 4,591,053
425 4,591,054
459 4,591,055
564 4,591,056

**CLASS 208**

40 4,591,424
74 4,591,425
96 4,591,426
161 4,591,427
165 4,591,428
254 H 4,591,429
4,591,430

**CLASS 209**

3 4,591,431
247 4,591,432

**CLASS 210**

114 4,591,433
117 4,591,434
230 4,591,435
264 4,591,436
265 4,591,437
282 4,591,438
638 4,591,439
640 4,591,440
649 4,591,441
656 4,591,442
747 4,591,443
748 4,591,444
781 4,591,445
797 4,591,446

**CLASS 211**

59.1 4,591,057
94 4,591,058

**CLASS 213**

32 R 4,591,059

**CLASS 215**

1 C 4,591,060
12 R 4,591,061
230 4,591,062
330 4,591,063

**CLASS 219**

10.55 B 4,591,681
4,591,683
4,591,684
10.55 F 4,591,682
74 4,591,685
81 4,591,686
93 4,591,687
121 EV 4,591,688
124.34 4,591,689
138 4,591,690
202 4,591,691
209 4,591,692
217 4,591,693
4,591,694
225 4,591,695
230 4,591,696
348 4,591,697
400 4,591,698
497 4,591,699
505 4,591,700
543 4,591,701

**CLASS 220**

1.5 4,591,064
7 4,591,065
69 4,591,066
81 R 4,591,067
240 4,591,068

**CLASS 221**

6 4,591,069
129 4,591,070

**CLASS 222**

39 4,591,071
44 4,591,072
55 4,591,073
153 4,591,074
195 4,591,075
321 4,591,076
4,591,077
517 4,591,078
538 4,591,079
598 4,591,080

**CLASS 224**

192 4,591,081

**CLASS 225**

2 4,591,082

**CLASS 226**

91 4,591,083
118 4,591,084

**CLASS 227**

8 4,591,085
19 4,591,086

**CLASS 228**

110 4,591,087
121 4,591,088
167 4,591,089

**CLASS 229**

15 4,591,090
17 G 4,591,091

**CLASS 235**

1 R 4,591,702
145 R 4,591,703
380 4,591,704
381 4,591,705
454 4,591,706
493 4,591,707

**CLASS 236**

49 4,591,092
94 4,591,093

**CLASS 237**

12.3 R 4,591,153

**CLASS 239**

17 4,591,094
102 4,591,095
216 4,591,096
265.29 4,591,097
288.3 4,591,098
419 4,591,099
533.12 4,591,101
533.3 4,591,100
655 4,591,102

**CLASS 241**

4 4,591,103
169.1 4,591,104

**CLASS 242**

18 A 4,591,105
18 G 4,591,106
47.01 4,591,107
84.5 R 4,591,108
129 4,591,109
129.8 4,591,110

**CLASS 244**

26 4,591,112
75 R 4,591,111
76 C 4,591,113
120 4,591,114
135 C 4,591,115
168 4,591,116
170 4,591,117
171 4,591,118

**CLASS 248**

74.2 4,591,119
179 4,591,120
201 4,591,121
280.1 4,591,122
349 4,591,123
447.2 4,591,124
476 4,591,125
524 4,591,126
551 4,591,127
652 4,591,128

**CLASS 250**

221 4,591,708
4,591,709
4,591,710
227 4,591,711
4,591,712
326 4,591,713
327.2 4,591,714
4,591,715
336.1 4,591,716
338 4,591,717
339 4,591,718
357.1 4,591,719
362 4,591,720
373 4,591,721
443.1 4,591,722
461.1 4,591,723
492.1 4,591,724
554 4,591,725
572 4,591,726
578 4,591,727

**CLASS 251**

64 4,591,129

**CLASS 252**

8.55 C 4,591,447
99 4,591,448
4,591,449
135 4,591,450
182.1 4,591,453
400 A 4,591,452
522 R 4,591,451
626 4,591,454
629 4,591,455

**CLASS 254**

134.3 PA 4,591,130
269 4,591,131

**CLASS 260**

239 A 4,591,457
239.3 B 4,591,458
245.2 R 4,591,459
369 4,591,460

**CLASS 261**

108 4,591,462
116 4,591,463
153 4,591,464

**CLASS 264**

22 4,591,465
35 4,591,466
37 4,591,467
40.1 4,591,468
45.3 4,591,469
59 4,591,470
60 4,591,471
87 4,591,472
129 4,591,473
253 4,591,474
328.14 4,591,475
4,591,476

**CLASS 266**

80 4,591,132
114 4,591,133
135 4,591,134
275 4,591,135

**CLASS 267**

154 4,591,136
182 4,591,137

**CLASS 269**

32 4,591,138

**CLASS 271**

9 4,591,139
11 4,591,140
127 4,591,141
196 4,591,142
227 4,591,143
246 4,591,144
258 4,591,145
275 4,591,146

**CLASS 272**

69 4,591,147
93 4,591,148
118 4,591,149
137 4,591,150
140 4,591,151

**CLASS 273**

1 GG 4,591,152
25 4,591,154
67 A 4,591,155
73 D 4,591,165
73 J 4,591,156
80 B 4,591,157
87.4 4,591,158
138 R 4,591,159
167 R 4,591,160
272 4,591,161
303 4,591,162
401 4,591,163
425 4,591,164

**CLASS 277**

1 4,591,166
88 4,591,167
134 4,591,168
135 4,591,169
235 B 4,591,170

**CLASS 279**

1 J 4,591,172
4 4,591,171

**CLASS 280**

21 R 4,591,173
28 4,591,174
33.99 C 4,591,175
47.36 4,591,176
91 4,591,177
154 4,591,178
291 4,591,179
293 4,591,180
476 R 4,591,181
647 4,591,182
655 4,591,183
666 4,591,184
707 4,591,185
4,591,186

**CLASS 281**

45 4,591,187

**CLASS 282**

29 B 4,591,188

**CLASS 283**

83 4,591,189
102 4,591,190

**CLASS 285**

18 4,591,191
83 4,591,192
138 4,591,193
249 4,591,194
332.3 4,591,195

**CLASS 292**

336.3 4,591,196

**CLASS 294**

86.24 4,591,197
88 4,591,198
96 4,591,200
137 4,591,201

**CLASS 296**

194 4,591,202
201 4,591,203
202 4,591,204

**CLASS 297**

85 4,591,205
148 4,591,206
366 4,591,207
487 4,591,208

**CLASS 299**

1 4,591,209

**CLASS 301**

5 BA 4,591,210
9 G 4,591,211
105 R 4,591,212

**CLASS 303**

93 4,591,213

**CLASS 307**

75 4,591,728
116 4,591,729
132 R 4,591,731
140 4,591,732
246 4,591,733
248 4,591,734
260 4,591,735
267 4,591,736
272 A 4,591,737
296 R 4,591,738
297 4,591,739
310 4,591,740
456 4,591,741
475 4,591,742
491 4,591,743
518 4,591,744
592 4,591,745

**CLASS 310**

70 A 4,591,746
71 4,591,747
81 4,591,748
156 4,591,749
237 4,591,750
269 4,591,751

**CLASS 312**

110 4,591,214
234.3 4,591,215

**CLASS 313**

25 4,591,752
146 4,591,753
336 4,591,754
412 4,591,755
420 4,591,756
461 4,591,757
518 4,591,758
638 4,591,759

**CLASS 315**

16 4,591,760
170 4,591,761
241 P 4,591,762
304 4,591,763
312 4,591,764
361 4,591,765

**CLASS 318**

254 4,591,766
314 4,591,767
327 4,591,768
331 4,591,769
565 4,591,770
569 4,591,771
632 4,591,772
663 4,591,773
696 4,591,774
711 4,591,775
717 4,591,776

**CLASS 320**

2 4,591,777
39 4,591,778

**CLASS 323**

301 4,591,779
313 4,591,780
323 4,591,781

**CLASS 324**

103 R 4,591,782
126 4,591,783
208 4,591,784
239 4,591,785
244 4,591,786
248 4,591,787
260 4,591,788
307 4,591,789
318 4,591,790
350 4,591,791
425 4,591,792
446 4,591,793
464 4,591,794

**CLASS 328**

5 4,591,795
184 4,591,796

**CLASS 329**

50 4,591,797
102 4,591,798

**CLASS 330**

45 4,591,799
86 4,591,800
261 4,591,801
277 4,591,802
4,591,803
288 4,591,804
294 4,591,805

**CLASS 331**

96 4,591,806
116 FE 4,591,808
116 R 4,591,807
117 R 4,591,809

**CLASS 332**

9 R 4,591,810
31 T 4,591,811

**CLASS 333**

116 4,591,812
117 4,591,813
177 4,591,814
195 4,591,815

**CLASS 335**

6 4,591,816
285 4,591,817
299 4,591,818

**CLASS 336**

178 4,591,819

**CLASS 337**

107 4,591,820
380 4,591,822

**CLASS 338**

308 4,591,821

**CLASS 339**

14 R 4,591,216
17 LM 4,591,217
4,591,218
4,591,219
17 M 4,591,220
19 4,591,221
74 R 4,591,222
97 C 4,591,224
97 R 4,591,223
99 R 4,591,225
117 R 4,591,226
157 C 4,591,227
198 H 4,591,228
251 4,591,229
258 R 4,591,230

**CLASS 340**

53 4,591,823
74 4,591,824
347 AD 4,591,825
4,591,830
347 C 4,591,827
347 DA 4,591,826
4,591,828
4,591,832
347 DD 4,591,829
347 SY 4,591,831
365 S 4,591,833
566 4,591,834
574 4,591,835
4,591,836
605 4,591,837
4,591,838
620 4,591,839
706 4,591,840
707 4,591,841
723 4,591,842
728 4,591,843
4,591,844
745 4,591,845
748 4,591,846
776 4,591,847
784 4,591,848
4,591,849
799 4,591,850
825.07 4,591,851
825.31 4,591,852
4,591,854
825.44 4,591,853
870.13 4,591,855

**CLASS 343**

5 AF 4,591,859
17.1 R 4,591,856
17.2 PC 4,591,857
17.7 4,591,858
390 4,591,860
404 4,591,861
427 4,591,862
702 4,591,863
754 4,591,864
767 4,591,865
781 P 4,591,866
841 4,591,867
903 4,591,868

**CLASS 346**

1.1 4,591,869
4,591,870
49 4,591,871
62 4,591,872
75 4,591,873
4,591,874
4,591,875
76 PH 4,591,876
4,591,877
4,591,878
4,591,879
108 4,591,880
117 R 4,591,881
136 4,591,882
140 R 4,591,883
153.1 4,591,884
159 4,591,885
160 4,591,886
200 4,591,887
209 4,591,888
213 Re.32,162

**CLASS 350**

3.71 4,591,236
4,591,242
96.15 4,591,237
96.18 4,591,231
96.27 4,591,232
254 4,591,239
334 4,591,233
339 R 4,591,240
358 4,591,241
414 4,591,243
422 4,591,234
427 4,591,235
4,591,244
504 4,591,245

**CLASS 351**

204 4,591,246
211 4,591,247

**CLASS 352**

133 4,591,248

**CLASS 353**

122 4,591,238

**CLASS 354**

62 4,591,249
76 4,591,250
159 4,591,251
191 4,591,252
223 4,591,254
227.1 4,591,253
303 4,591,255
402 4,591,256
403 4,591,257

**CLASS 355**

3 R 4,591,258
4,591,260
3 SH 4,591,259
4 4,591,261
14 CH 4,591,262
43 4,591,263
68 4,591,264
100 4,591,265

**CLASS 356**

244 4,591,266
316 4,591,267
333 4,591,270
338 4,591,268
350 4,591,269
432 4,591,271
4,591,272

**CLASS 357**

4 4,591,889
23.11 4,591,890
23.12 4,591,891
30 4,591,892
4,591,893
42 4,591,894
4,591,895
79 4,591,896

**CLASS 358**

22 4,591,897
36 4,591,898
41 4,591,899
44 4,591,900
50 4,591,901
59 4,591,902
75 4,591,903
4,591,904
4,591,905
84 4,591,906
136 4,591,907
4,591,908
4,591,909
148 4,591,910
160 4,591,911
166 4,591,912
183 4,591,913
190 4,591,914
194.1 4,591,915
213 4,591,916
4,591,917
225 4,591,918
227 4,591,919
250 4,591,920
257 4,591,921
280 4,591,922
284 4,591,923
330 4,591,924
336 4,591,925

**CLASS 360**

13 4,591,926
4,591,928
15 4,591,927
32 4,591,929
35.1 4,591,930
46 4,591,939
72.1 4,591,931
74.1 4,591,932
78 4,591,933
93 4,591,934
96.3 4,591,935
101 4,591,937
132 4,591,936
137 4,591,938

**CLASS 361**

42 4,591,941
68 4,591,940
97 4,591,942
145 4,591,943
170 4,591,944
212 4,591,945
284 4,591,946
310 4,591,947
315 4,591,948
394 4,591,949
399 4,591,950
417 4,591,951
433 4,591,952

**CLASS 362**

33 4,591,953
61 4,591,954
101 4,591,955
144 4,591,956
148 4,591,957
219 4,591,958
252 4,591,959
298 4,591,960
390 4,591,961

**CLASS 363**

15 4,591,962
17 4,591,963
24 4,591,964
43 4,591,965
91 4,591,966

**CLASS 364**

132 4,591,967
167 4,591,968
183 4,591,969
200 4,591,971
4,591,972
4,591,973
4,591,974
4,591,975
4,591,976
4,591,977
4,591,978
4,591,979
4,591,980
4,591,981
4,591,982
403 4,591,983
414 4,591,984
424 4,591,985
426 4,591,986
431.11 Re.32,163
458 4,591,987
464 4,591,988
474 4,591,989
4,591,990
478 4,591,991
483 4,591,992
491 4,591,993
500 4,591,994
507 4,591,995
508 4,591,996
519 4,591,997
521 4,591,998
523 4,591,999
557 4,592,000
565 4,592,001
571 4,592,002
579 4,592,003
713 4,592,004
736 4,592,005
748 4,592,006
784 4,592,007
4,592,008
821 4,592,009
900 4,592,010
4,592,011
4,592,012
4,592,013

**CLASS 365**

1 4,592,014
2 4,592,015
15 4,592,016
19 4,592,017
63 4,592,018
78 4,592,019
189 4,592,020
4,592,021
4,592,022
4,592,023
200 4,592,024
4,592,025
203 4,592,026
4,592,027
230 4,592,028

**CLASS 366**

279 Re.32,159
288 4,591,273
336 4,591,274
349 4,591,275

**CLASS 367**

7 4,592,029
27 4,592,030
45 4,592,031
73 4,592,032
76 4,592,033
127 4,592,034

**CLASS 369**

32 4,592,035
4,592,036
44 4,592,037
4,592,038
75.2 4,592,039
77.1 4,592,040
126 4,592,041
258 4,592,042

**CLASS 370**

3 4,592,043
13 4,592,044
58 4,592,045
4,592,046
4,592,047
60 4,592,048
87 4,592,049
103 4,592,050
4,592,051
104 4,591,730

**CLASS 371**

21 4,592,052
29 4,592,053
39 4,592,054
62 4,592,055

**CLASS 372**

5 4,592,056
8 4,592,057
32 4,592,058
36 4,592,059
44 4,592,060
45 4,592,061
48 4,592,062
58 4,592,063
73 4,592,064
83 4,592,065

**CLASS 373**

72 4,592,066
83 4,592,067

**CLASS 375**

3 4,592,068
8 4,592,069
27 4,592,070
42 4,592,071
55 4,592,072
60 4,592,073
75 4,592,074
81 4,592,075
108 4,592,076
110 4,592,077

**CLASS 376**

204 4,591,477
253 4,591,478
349 4,591,479

**CLASS 377**

52 4,592,078

**CLASS 378**

9 4,592,079
19 Re.32,164
4,592,080
34 4,592,081
075 4,592,082
160 4,592,083
170 4,592,084

**CLASS 381**

43 4,592,085
4,592,086
68 4,592,087
90 4,592,088

**CLASS 382**

6 4,592,089
7 4,592,090

**CLASS 383**

15 4,592,091
80 4,592,092

**CLASS 384**

206 4,591,276
480 4,591,278

**CLASS 400**

121 4,591,279
124 4,591,280
126 4,591,281
144.2 4,591,282
248 4,591,283
691 4,591,284

**CLASS 403**

11 4,591,285
170 4,591,286
237 4,591,287
260 4,591,288
322 4,591,289

**CLASS 404**

25 4,591,290
118 4,591,291

**CLASS 405**

169 4,591,292
170 4,591,293
4,591,294
195 4,591,295
4,591,296
258 4,591,297
282 4,591,298

**CLASS 408**

1 R 4,591,299
59 4,591,300
76 4,591,301
188 4,591,302
206 4,591,303

**CLASS 409**

92 4,591,304
175 4,591,305
179 4,591,306

**CLASS 410**

83 4,591,307

**CLASS 414**

11 4,591,308
546 4,591,309
786 4,591,310

**CLASS 415**

53 T 4,591,311
121 R 4,591,312

**CLASS 416**

155 4,591,313

**CLASS 417**

47 4,591,314
259 4,591,315
4,591,316
288 4,591,317
312 4,591,318
360 4,591,319
390 4,591,320
499 4,591,321

**CLASS 418**

48 4,591,322

**CLASS 419**

9 4,591,480
26 4,591,481
38 4,591,482

**CLASS 420**

463 4,591,483
481 4,591,484

**CLASS 422**

20 4,591,485
72 4,591,486
134 4,591,487

**CLASS 423**

11 4,591,488
100 4,591,489
210 4,591,490
329 4,591,491
345 4,591,492
383 4,591,493
522 4,591,494
4,591,495

**CLASS 424**

15 4,591,496
4,591,500
28 4,591,501
43 4,591,497
63 4,591,502
70 4,591,498
93 4,591,499
4,591,503
94 4,591,504
101 4,591,505
131 4,591,506

**CLASS 425**

97 4,591,323
222 4,591,324
233 4,591,325
256 4,591,326
305.1 4,591,327
324.1 4,591,328
340 4,591,329
567 4,591,330

**CLASS 426**

595 4,591,508
604 4,591,507

**CLASS 427**

62 4,591,509
125 4,591,510
142 4,591,511
163 4,591,512
200 4,591,513
249 4,591,514
297 4,591,515
375 4,591,516
378 4,591,517
385.5 4,591,518

**CLASS 428**

35 4,591,519
64 4,591,520
78 4,591,521
131 4,591,523
167 4,591,524
195 4,591,525
198 4,591,526
201 4,591,527
212 4,591,528
252 4,591,529
325 4,591,530
419 4,591,522
468 4,591,531
493 4,591,532
520 4,591,533
593 4,591,534
627 4,591,535
643 4,591,536
698 4,591,537

**CLASS 429**

16 4,591,538
27 4,591,539

**CLASS 430**

22 4,591,540
59 4,591,541
4,591,542
125 4,591,543
166 4,591,544
270 4,591,546
284 4,591,545
312 4,591,547
389 4,591,548
569 4,591,549

**CLASS 431**

16 4,591,331
62 4,591,332

**CLASS 432**

10 4,591,333
15 4,591,334
4,591,335
59 4,591,336
138 4,591,337
148 4,591,338
205 4,591,339
234 4,591,340

**CLASS 433**

6 4,591,341

**CLASS 434**

18 4,591,342

**CLASS 435**

4 4,591,550
7 4,591,552
15 4,591,551
16 4,591,553
18 4,591,554
26 4,591,555
33 4,591,556
68 4,591,557
4,591,558
76 4,591,559
96 4,591,560
101 4,591,561
108 4,591,562
193 4,591,563
194 4,591,564
223 4,591,565
291 4,591,566
293 4,591,567

**CLASS 436**

180 4,591,568
500 4,591,569
518 4,591,570

# CLASSIFICATION OF PATENTS

533 4,591,571
538 4,591,572
542 4,591,573

**CLASS 441**

76 4,591,343

**CLASS 445**

30 4,591,344

**CLASS 446**

361 4,591,345
437 4,591,346
462 4,591,347

**CLASS 455**

4 4,592,093
164 4,592,094
327 4,592,095

**CLASS 464**

64 4,591,348
136 4,591,349
138 4,591,350

**CLASS 474**

49 4,591,351
95 4,591,352
245 4,591,353

**CLASS 493**

439 4,591,354

**CLASS 501**

136 4,591,574
154 4,591,575

**CLASS 502**

65 4,591,576
105 4,591,577
185 4,591,578
244 4,591,579
303 4,591,580
407 4,591,581

**CLASS 514**

114 4,591,582
120 4,591,583
160 4,591,584
177 4,591,585
211 4,591,586
222 4,591,587
4,591,588
248 4,591,589
252 4,591,590
254 4,591,591
301 4,591,592
307 4,591,593
339 4,591,594
367 4,591,595
375 4,591,596
392 4,591,597
412 4,591,598
413 4,591,599
456 4,591,600
462 4,591,601
463 4,591,602
469 4,591,603
577 4,591,604
579 4,591,605
588 Re.32,161

**CLASS 521**

79 4,591,606
137 4,591,607

**CLASS 522**

13 4,591,608

**CLASS 523**

336 4,591,609

**CLASS 524**

55 4,591,610
64 4,591,611
425 4,591,612
597 4,591,613

**CLASS 525**

54.11 4,591,614
179 4,591,615
185 4,591,616
187 4,591,617
279 4,591,618
285 4,591,619
328.8 4,591,620
344 4,591,621
477 4,591,622
524 4,591,623

**CLASS 526**

177 4,591,624
265 4,591,625
282 4,591,626

**CLASS 528**

103 4,591,627
308.2 4,591,629
481 4,591,632
485 4,591,633
503 4,591,630
930 4,591,631

**CLASS 530**

356 4,591,456

**CLASS 534**

570 4,591,634
612 4,591,635

**CLASS 536**

6.4 4,591,636
4,591,637
51 4,591,638
114 4,591,639
4,591,640

**CLASS 544**

16 4,591,641
4,591,642
76 4,591,643
201 4,591,644

**CLASS 548**

142 4,591,645
146 4,591,628
4,591,646
157 4,591,647
344 4,591,648

**CLASS 549**

232 4,591,649
268 4,591,650
473 4,591,651

**CLASS 556**

419 4,591,652
4,591,653

**CLASS 558**

429 4,591,461

**CLASS 604**

159 4,591,355
179 4,591,356
416 4,591,357

**CLASS 623**

6 4,591,358

**CLASS 794**

88 4,591,199

# CLASSIFICATION OF DESIGNS

D2— 232 283,940
257 283,941
273 283,942
400 283,943
420 283,944
431 283,945
D3— 30.1 283,946
34 283,947
35 283,948
283,949
58 283,950
D4— 105 283,951
108 283,952
122 283,953
D6— 310 283,954
330 283,955
339 283,956
407 283,957
426 283,958
492 283,959
511 283,960
534 283,961
553 283,962
599 283,963
D7— 43 283,964
70 283,965
76 283,966
152 283,967
283,968
309 283,969
360 283,970
383 283,971
384 283,972
D8— 1 283,973
14 283,974
30 283,975
75 283,976
301 283,977
347 283,978
353 283,979
D9— 307 283,980
389 283,981
442 283,982
499 283,983
D10— 39 283,984
71 283,985
83 283,986
101 283,988
106 283,989
D11— 97 283,990
143 283,991
148 283,992
155 283,993
D12— 83 283,994
110 283,995
147 283,996
156 283,997
187 283,998
196 283,999
211 284,000
D13— 16 284,001
D14— 30 284,002
56 284,003
58 284,004
59 284,005
111 284,006
284,007
113 284,008
115 284,009
D15— 29 284,010
139 284,011
D18— 13 284,012
284,013
15 284,014
D21— 59 284,015
84 284,016
109 284,017
134 284,018
141 284,019
148 284,020
244 284,021
D23— 43 284,022
53 284,023
69 284,024
142 284,025
D24— 1.1 284,026
16 284,027
18 284,028
21 284,029
25 284,030
36 284,032
52 284,033
284,034
58 284,035
D27— 36 284,031

# GEOGRAPHICAL INDEX

# OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)


| | | | | | |
|---|---|---|---|---|---|
| Alabama | 1 | Kentucky | 21 | Oregon | 41 |
| Alaska | 2 | Louisiana | 22 | Pennsylvania | 42 |
| American Samoa | 3 | Maine | 23 | Puerto Rico | 43 |
| Arizona | 4 | Maryland | 24 | Rhode Island | 44 |
| Arkansas | 5 | Massachusetts | 25 | South Carolina | 45 |
| California | 6 | Michigan | 26 | South Dakota | 46 |
| Canal Zone | 7 | Minnesota | 27 | Tennessee | 47 |
| Colorado | 8 | Mississippi | 29 | Texas | 48 |
| Connecticut | 9 | Missouri | 29 | Utah | 49 |
| Delaware | 10 | Montana | 30 | Vermont | 50 |
| District of Columbia | 11 | Nebraska | 31 | Virginia | 51 |
| Florida | 12 | Nevada | 32 | Virgin Islands | 52 |
| Georgia | 13 | New Hampshire | 33 | Washington | 53 |
| Guam | 14 | New Jersey | 34 | West Virginia | 54 |
| Hawaii | 15 | New Mexico | 35 | Wisconsin | 55 |
| Idaho | 16 | New York | 36 | Wyoming | 56 |
| Illinois | 17 | North Carolina | 37 | U.S. Air Force | 57 |
| Indiana | 18 | North Dakota | 38 | U.S. Army | 58 |
| Iowa | 19 | Ohio | 39 | U.S. Navy | 59 |
| Kansas | 20 | Oklahoma | 40 | | |


(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 : | 4,590,632 | | 4,591,077 | | 4,591,837 | | 4,591,745 | | 4,590,967 | | 4,591,070 |
| | 4,590,719 | | 4,591,081 | | 4,591,852 | | 4,591,747 | | 4,590,970 | | 4,591,109 |
| | 4,591,001 | | 4,591,088 | | 4,591,855 | | 4,591,864 | | 4,590,982 | | 4,591,129 |
| | 4,591,071 | | 4,591,104 | | 4,591,872 | | 4,591,942 | | 4,591,059 | | 4,591,178 |
| | 4,591,130 | | 4,591,118 | | 4,591,885 | | 4,591,959 | | 4,591,099 | | 4,591,206 |
| | 4,591,666 | | 4,591,150 | | 4,591,915 | | 4,591,987 | | 4,591,144 | | 4,591,817 |
| | 4,591,868 | | 4,591,157 | | 4,591,925 | | 4,591,999 | | 4,591,151 | | 4,592,074 |
| 02 : | 4,590,831 | | 4,591,165 | | 4,591,929 | | 4,592,055 | | 4,591,162 | 20 : | 4,590,990 |
| 04 : | 4,590,625 | | 4,591,175 | | 4,591,933 | | 4,592,058 | | 4,591,213 | 21 : | 4,590,660 |
| | 4,590,745 | | 4,591,192 | | 4,591,938 | 10 : | 4,591,378 | | 4,591,215 | | 4,590,886 |
| | 4,590,834 | | 4,591,194 | | 4,591,949 | | 4,591,617 | | 4,591,217 | | 4,590,932 |
| | 4,590,960 | | 4,591,224 | | 4,591,960 | 12 : | 4,590,664 | | 4,591,218 | | 4,591,201 |
| | 4,591,131 | | 4,591,230 | | 4,591,965 | | 4,590,737 | | 4,591,219 | | 4,591,205 |
| | 4,591,351 | | 4,591,233 | | 4,591,966 | | 4,590,746 | | 4,591,225 | | 4,591,282 |
| | 4,591,704 | | 4,591,251 | | 4,591,976 | | 4,590,791 | | 4,591,275 | | 4,591,425 |
| | 4,591,740 | | 4,591,266 | | 4,591,980 | | 4,590,839 | | 4,591,285 | | 4,591,820 |
| | 4,591,795 | | 4,591,277 | | 4,591,983 | | 4,590,941 | | 4,591,291 | 22 : | 4,590,931 |
| | 4,591,806 | | 4,591,284 | | 4,592,004 | | 4,590,949 | | 4,591,302 | | 4,591,008 |
| | 4,591,821 | | 4,591,334 | | 4,592,081 | | 4,590,993 | | 4,591,314 | | 4,591,430 |
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| | 4,591,842 | | 4,591,341 | | 4,592,092 | | 4,591,097 | | 4,591,328 | 23 : | 4,590,690 |
| | 4,591,890 | | 4,591,347 | 08 : | Re.32,160 | | 4,591,227 | | 4,591,344 | | 4,591,290 |
| 06 : | Re.32,157 | | 4,591,411 | | 4,590,700 | | 4,591,343 | | 4,591,356 | | 4,591,482 |
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| | 4,590,682 | | 4,591,442 | | 4,590,779 | | 4,591,794 | | 4,591,566 | 24 : | 4,590,815 |
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| | 4,590,698 | | 4,591,478 | | 4,591,021 | | 4,591,826 | | 4,591,689 | | 4,590,853 |
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| | 4,590,727 | | 4,591,551 | 09 : | 4,590,644 | | 4,592,012 | | 4,591,910 | | 4,591,455 |
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| | 4,590,792 | | 4,591,694 | | 4,591,046 | | 4,591,357 | 18 : | 4,590,864 | | 4,591,580 |
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| | 4,590,871 | | 4,591,721 | | 4,591,220 | 16 : | 4,590,921 | | 4,591,135 | | 4,591,862 |
| | 4,590,901 | | 4,591,737 | | 4,591,329 | 17 : | Re.32,158 | | 4,591,309 | | 4,592,050 |
| | 4,590,923 | | 4,591,743 | | 4,591,377 | | 4,590,627 | | 4,591,333 | | 4,592,056 |
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| | 4,591,024 | | 4,591,774 | | 4,591,538 | | 4,590,785 | | 4,591,832 | | 4,591,055 |
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| | 4,591,048 | | 4,591,808 | | 4,591,595 | | 4,590,877 | 19 : | 4,590,751 | | 4,591,254 |
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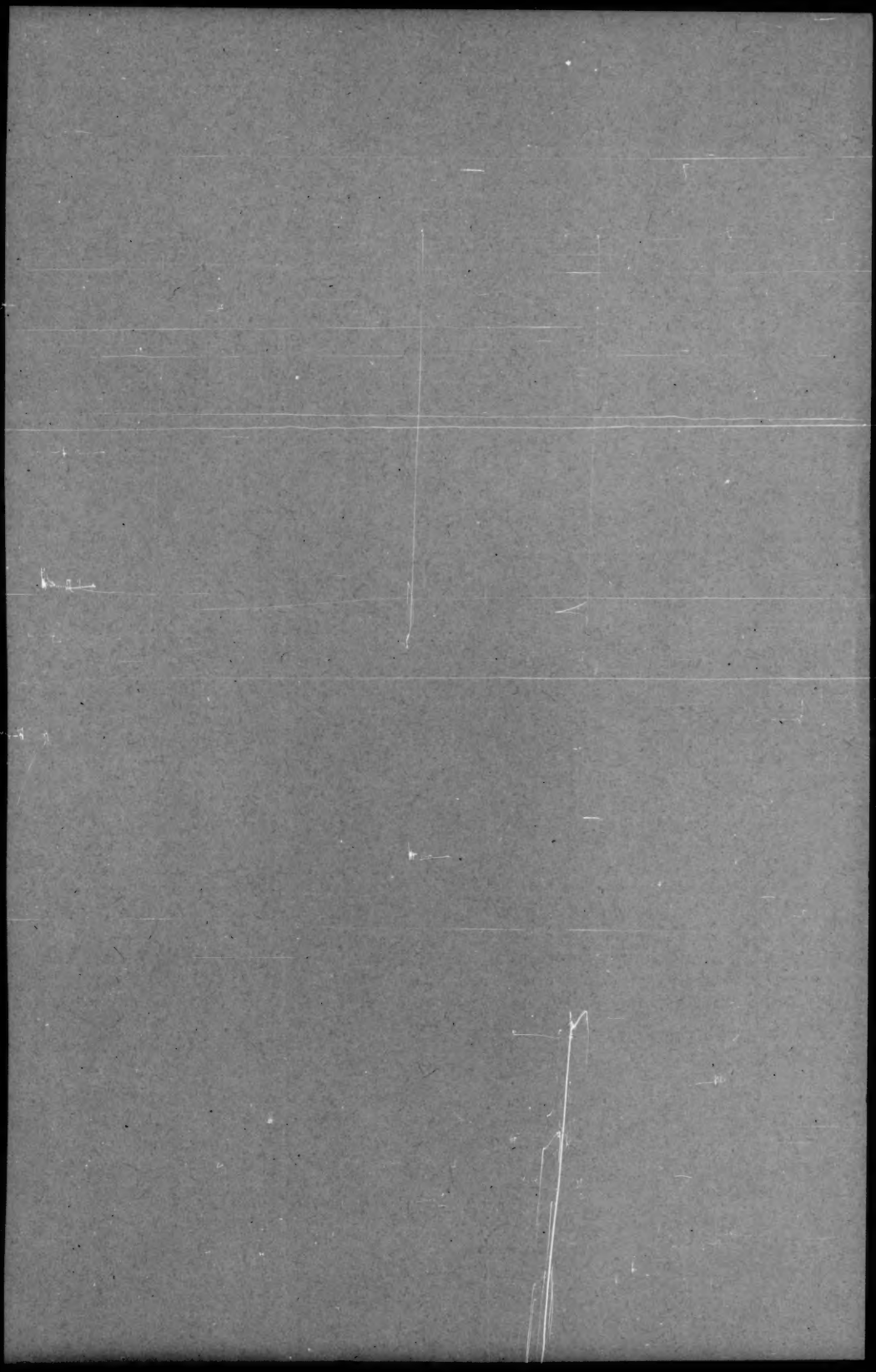

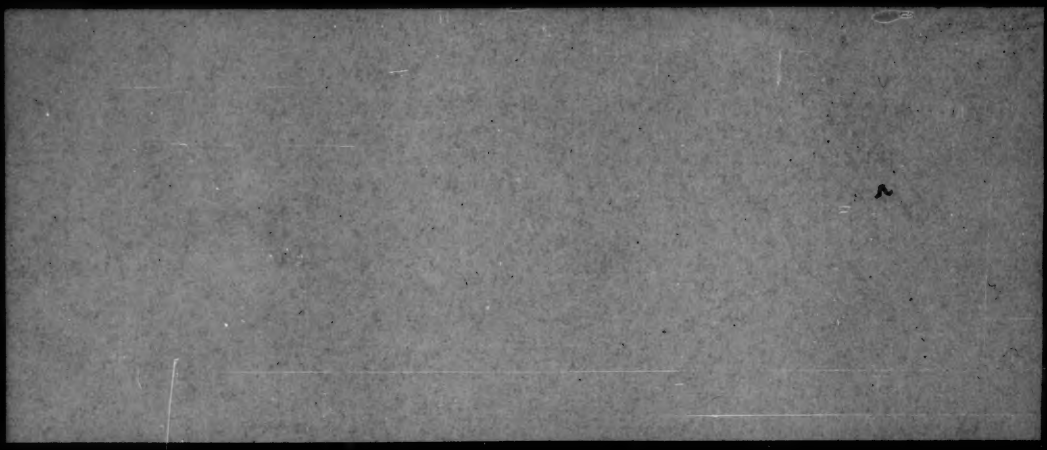

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Malcolm Baldrige, *Secretary*
PATENT AND TRADEMARK OFFICE
Donald J. Quigg, *Commissioner*